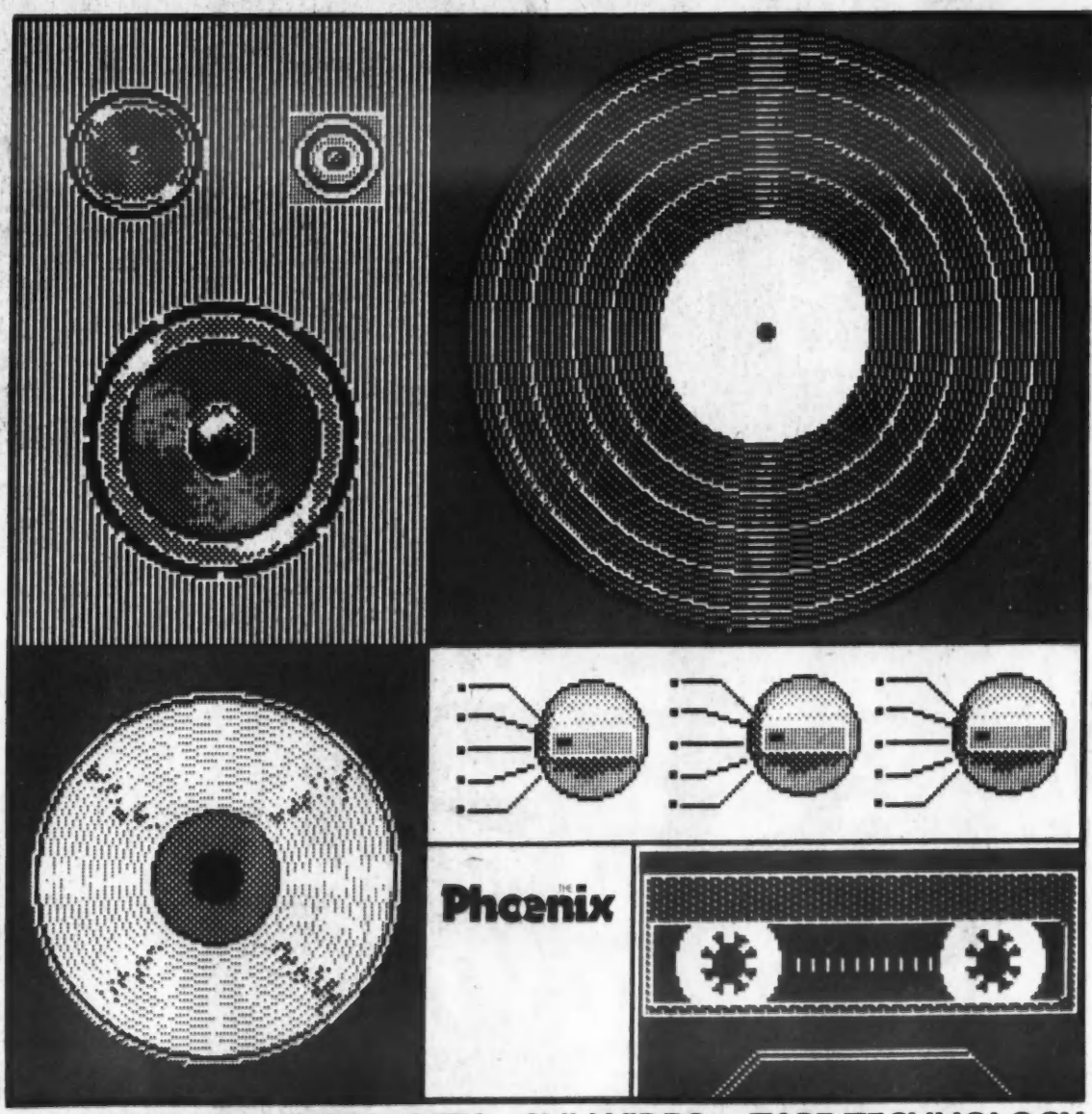
HOME ELECTRONICS



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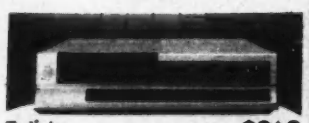

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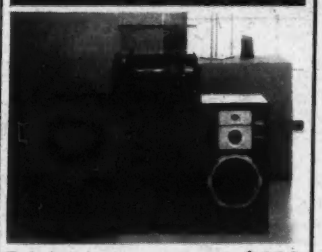

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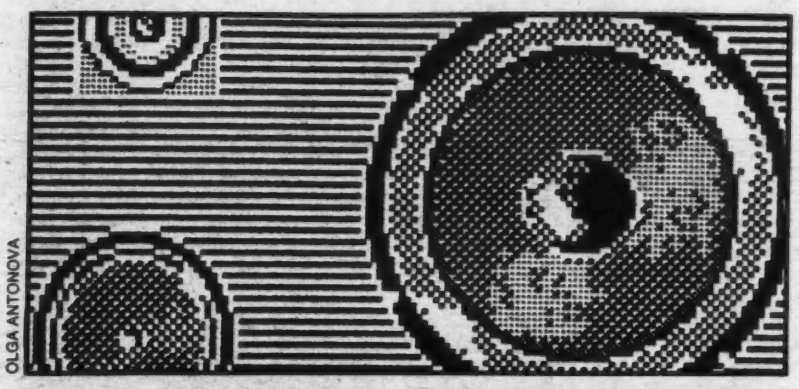

OLGA ANTONOVA

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Revox B225

For those who waited.

And those who wish they had.

All Compact Disc players are *not* created equal. This much, at least, has emerged from all the hype and hoopla.

Some CD players are built better than others. Some have more sophisticated programming features. Some are easier to use. And, yes, some *do* sound significantly better than others.

The new B225, from Revox of Switzerland, excels on all counts. For those who have postponed their purchase, patience has been rewarded. For those who didn't wait, the B225 is the logical upgrading route.

First, the B225 is designed for unexcelled CD reproduction. By using oversampling (176.4 kHz) in conjunction with digital filtering, the B225 guarantees optimum sound resolution and true phase response.

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Finally, the B225 is a product of refined Swiss design and meticulous craftsmanship. Behind its faceplate of functional elegance, the B225 is an audio component built in quiet defiance of planned obsolescence.

Without question, the definitive CD player has just arrived. For those who waited (and those who didn't), now is the time to see an authorized Revox dealer.

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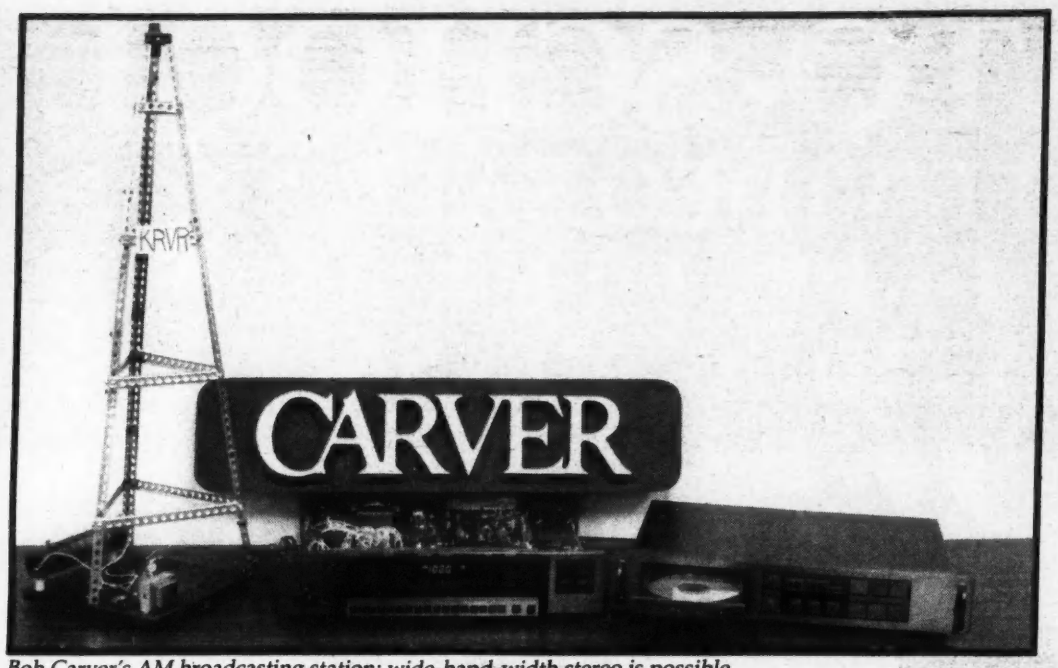

Bob Carver's AM broadcasting station: wide-band-width stereo is possible

Tidings of great toys

A report from the Consumer Electronics Show

by E. Brad Meyer

This account of the Consumer Electronics Show (CES), held this past June, is even more fragmentary than usual, not just because the show is getting bigger and harder to cover, but also because in many categories the incremental changes that remain to be made are less interesting than innovations of previous years. Pre-amps, power amplifiers, tuners, and even audio-cassette decks are so good that dramatic improvements in absolute performance are very difficult to make. Still, even at a businesslike show such as this one, there were a few new scents in the wind.

Video

The biggest news at the show concerned 8mm video (see Peter Mitchell's article, page 8). Last winter there was widespread resistance to the introduction of a third VCR format, partly because the Japanese companies that produce the video recorders sold in this country were still doing very well with half-inch and didn't want to upset their own apple cart.

This time Sony came out heavily for the new 8mm size, selling their own machines and showing ones they're manufacturing for Pioneer. The new hardware is smaller and more elegant than VHS or Beta. The full-featured table-top recorder is slightly larger than a collegiate dictionary; picture quality has been improved to roughly the equivalent of an average VHS recorder.

Even more impressive is the sound. A new method of digitally encoding the sound along with the picture promises reproduction that will be limited only by the source, in addition to the consecutive recording of up to six separate digital stereo programs on a single tape. With the new two-hour tapes, this means 12 hours of high-fidelity stereo on a single tape about the size of an ordinary audio cassette, with a further doubling of time to 24 hours should a projected slower speed prove successful.

In the meantime Sony intends to keep Beta alive as a format for videophiles, with an emphasis on picture and sound quality. Henceforth, all their machines will feature both Beta Hi-Fi and SuperBeta high-bandwidth video.

One technology that has yet to make its full impact is digital TV. The term refers not to a whole new method of broadcasting television signals but rather to the digitization and subsequent processing of the video signal once it gets inside the set. Digital sets were shown by Toshiba, Panasonic (along with its sister company, Quasar), and Sony. So far, digital processing is being used not for the major enhancements in picture quality and automatic internal adjustment that are its most promising features but for gimmickry. The new sets can show a second, smaller picture within the main one. This means that you can watch a football game on the main screen and use the little one to edit out the commercials in a movie you're taping. Sony's digital set comes with an 80-page memo pad, which you can write on using the remote control. Has anyone out there ever had the urge to make notes on a TV screen while watching it?

In fairness, I ought to point out that part of the reason manufacturers are approaching digital with caution is that there is only one factory producing the required chips, and its output is insufficient to support a major shift in that direction.

The amateur video producer has more editing hardware to play with this year. At CES, Sansui showed the AV-99 audio/video signal processor with color processing, audio and video fading, several different wipes (video cross-fades), microphone mixing, and a special-effects section called Video Art ($500).

Surround sound processors, which send the sound effects from Dolby Stereo movies out to additional side or rear speakers, continue their slow climb in popularity. In addition to the separate decoders from Audionics and Surround Sound (and a new model rumored to be coming out this fall from Shure), companies such as Sansui, NEC, Technics, Pioneer, and Yamaha are building surround capability into their video systems. The next appearance of this circuitry will be inside the VCRs themselves.

Most people, however, have no need for a third or fourth amplifier and speaker because they don't yet have second ones. With three local channels (2, 4, and 66) now broadcasting in stereo, all you people with 10-year-old sets might begin to feel left out. With no decoder output, where are you going to get your stereo TV sound? Answer: from a new product designed for Recoton by Larry Shotz, who was known previously for his audio FM tuners. The V622 universal stereo TV decoder sticks onto the outside of your set with Velcro and picks up the secondary radiation from the set's audio tuner, decodes the stereo, and sends it out to a separate amplifier and speakers (not included).

Audio Electronics

Remote control, to which users of video gear and some CD players have become accustomed, is becoming more common in ordinary audio components put out by the major Japanese factories: Revox, Kenwood, Marantz, Yamaha, Sansui, and Luxman. You can operate some systems, such as those from Revox, B & O, and now Kyocera, from more than one location with the aid of a separate controller.

Audio Control has resurrected an old idea. According to the company's literature, the new Phase Coupled Activator "detects trace elements of bass which have been lost in the recording process and digitally reconstructs fundamentals in the last two octaves." Lest the idea remind you of the old dbx boom box, Audio Control hastens to add that its unit doesn't synthesize new frequencies; it only "reconstructs" existing notes. The device goes in your tape-monitor loop, has an additional output for a separately amplified subwoofer, and costs $259.

Power amplifiers continue to get smaller, lighter, cheaper, and mightier. The latest champion in the watts-per-dollar race (though perhaps we should say amps-per-dollar, since that measure of performance is often more significant) is the NAD 2200. Listing for about $450, the 2200 is conservatively rated at 100 watts/channel but will put out more than a kilowatt per side into 2 Ohms for brief periods on musical peaks. Even when overloaded, its soft clipping circuit prevents harsh-sounding distortion.

Loudspeakers

As always, CES was the scene of many new speakers. Polk Audio introduced a new top-of-the-line model, the SDA Signature Reference System. The speaker uses Polk's image-enhancing technology in the midrange (up to about 1000Hz) but not in the highs; it has 12 drivers per cabinet, and a pair sells for about $2600. John Bowers, one of the principals of the English firm B & W, will use that company's distribution network to sell the John Bowers Active 1, a $3000/pair internally biamplified system with an outboard control unit; speaker stands are included.

Still trying to succeed in the notoriously critical American speaker market is Pioneer, whose $500 DSS-E10 was reportedly designed (along with several other new models) for American tastes with the aid of local leaders, musicians, and audio critics.

The second-generation Soundfield Ten speaker introduced by dbx sells for about $1600 a pair and has an outboard electronic processor. Celestion introduced three two-way systems, the DL-4, DL-6, and DL-8, for $300, $400, and $500 a pair, respectively. The DL-8 has Celestion's new high-efficiency aluminum-dome tweeter.

High-End Analog

Most of the interest in turntables, arms, and cartridges nowadays lies at the high end. There's a new winner in the tone-arm (high) price race: Souther Engineering's Tribeam 12 is an update of Lou Souther's successful earlier design, with added strength and damping, a new top plate that comes engraved with the owner's name, and an adjustment mechanism that changes the height of the arm during play to fine-tune the stylus rake angle. The Tribeam 12 sells for $3000; a larger version for

Continued on page 6

(Clockwise from top) Audio Control's Phase-Coupled Activator, Sansui's AV-99 Signal Processor, and dbx's DX3 Compact Disc Player: incremental changes

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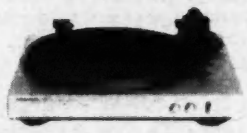

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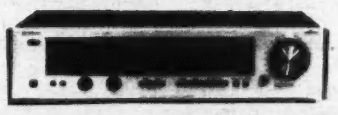

NIKKO NR320 28 watt per channel AM/FM stereo receiver. Regular $199.

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HARMAN KARDON 330i 20 watts per channel high current capability and ultrawidebandth amp section. regular $249.

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LUXMAN R-404 33 watts per channel digital synthesized AM/FM receiver. Regular $329.

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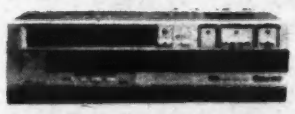
VIDEO



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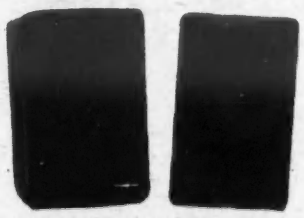

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CES

Continued from page 4

playing 16-inch 78rpm transcriptions is $3500.

CD Players

By now almost every audio-electronics company has a CD player. Features and prices tend to correspond to the company's previous marketing strategy and style. ADS's player is a sleek, beautiful unit with immaculate performance and lists for more than $800. Harman-Kardon brings changes to its wide-bandwidth theme with a filtering system that the company claims reduces out-of-band distortion and noise products. The new $600 player from dbx has three additional signal-processing features: a built-in dynamic range compressor for background listening or copying to audio cassettes; an impact-restoration circuit for enhancing the dynamics of transients; and a circuit that increases ambience information in the midrange.

Technics responded to the challenge of Sony's miniature D-5 by showing its SL-PJ1, a $300 portable player that's the smallest yet (especially given its battery pack and case) and programmable.

Companies that aren't adding new features are cutting prices. Several manufacturers, including dbx's sister company, ADC, are weighing in at the $300 list-price point, with some Korean-made units slated for introduction later this year at less than $200.

Meanwhile, the CD software crunch shows no signs of abating. Although, as consumers, we see a steady trickle of new releases, pressing plants are so backed up that most are refusing new customers, and titles that have sold out may take months to reappear.

Accessories After the Fact

If the CD replaces the LP, what will happen to the companies who make record cleaners? Need you even ask? CD-cleaning packages are either available or coming on the market soon from Recoton, Allsop, Discwasher, Bib, Koss, and Memtek (formerly known as Memorex). Prices range from $15 to $30, and some of the kits do more than just clean.

The need for such products may not be apparent to those who believed the early hype that CDs are immune to dust, fingerprints, scratches, marring, dents, gouges, and sledgehammer blows. In fact, CDs require almost as much care as a vinyl record, and if they receive such care, the sound will never deteriorate.

When the CD was first shown in this area, at a Boston Audio Society meeting two years ago, David Ranada (now of *High Fidelity* magazine) took a sample CD — one whose music he didn't care about — and passed it around the room, collecting several hundred fingerprints. At first the disc wouldn't play at all, but a quick wiping with a handkerchief restored its sound completely. If you don't touch the playing surface, you won't have to wipe the disc at all. An informal survey at a local laser-rental emporium suggests that people are careful with CDs — which is not true of video-disc renters.

The cleaning method for CDs is different from that used for vinyl records. To clean an LP you must use a brush or pad whose fibers sweep along the bottom of the groove. On a CD a cleaning pad that drags dust particles in a circular path could make scratches that follow the rows of pits, thus obscuring a block of data too large for the player's error-correction circuits to handle. A CD should always be cleaned with radial strokes, from center to edge.

Most of the new cleaners have gears that translate the hand's instinctive circular wiping motion into some approximation of the correct radial method. Also included is such a set's usual proprietary cleaning fluid. Two kits contain additional material: the Recoton ($24.95) has a couple of small swabs and a bottle of "restorer" that contains a fine abrasive for polishing out small scratches. (If you can't find the Recoton, use a Q-tip and toothpaste, again wiping from center to edge; then rinse the CD gently with water.) The Bib 607 kit ($14.95) comes in a plastic tray that holds six CDs; additional trays can be attached later to expand your storage facility.

Hi-Fi AM?

Carver Corporation always has something entertaining to show the press at CES. This time it was a fascinating demonstration of an AM broadcasting set-up with an audio bandwidth of 15kHz — a bandwidth equal to that of FM. To prove it, Bob Carver had brought along a miniature AM broadcasting station, complete with an antenna made from old Erector Set parts. Using a CD player as a source, he demonstrated the system's bandwidth capability by comparing the signal coming straight from the CD player with the output of a specially modified AM receiver placed a few feet away.

Carver failed to achieve his claimed 77dB signal/noise ratio in stereo because of a high-frequency noise problem coming from the AM tuner. Nevertheless, he made a valid technical point with this demonstration, the importance of which will affect the entire AM broadcasting industry. FM stations all use a standard high-frequency pre-emphasis curve to boost the highs above the noise; a corresponding de-emphasis in your FM tuner restores the correct response. No such standard exists in AM broadcasting, and Carver's proposed curve (whose inflection points are at 1kHz and 4kHz, or 150 and 37 microseconds) is well thought out and easy to implement. If those who make up the industry can get together and adopt a standard — and Carver's seems like a good one because it's similar to what many stations are already doing — AM stereo may turn out to be worth something after all.

Cassette Decks

Cassette-deck makers are responding to the perceived need for greater dynamic range by introducing new models with Dolby HX Pro, an effective headroom extension circuit. The price of the new HX Pro recorder is lower than that of previous models: Yamaha's K-1020 and K-720 retail for $599 and $499, respectively; Harmon-Kardon's TD392 is $550; Denon's DR-M44HX is $599 and its DR-M33HX is $499; and the cheapest is the NAD 6155, at $348. The price of Kyocera's D-811 hasn't been set.

Auto-reverse record/play and twin transports for dubbing are popular features of the new models. Akai has a "record cancel" button that's ideal for copying your favorite songs from FM. You start the tape as the commercial ends, and if the next song isn't a keeper, a single button push will drop the machine out of record, rewind to the beginning of the latest segment, and record four seconds of silence prior to the next cut.

Did He Say Typewriters?

One product you might have expected to have withered under the onslaught of word processors and printers is the electric typewriter. It's still with us, only now it's the *electronic* typewriter, if you please. Smith-Corona put together one of the show's more interesting displays to demonstrate its new SE-200 ($369) and SD-300 ($499) machines, both of which have built-in spelling correction.

In normal use, the typewriter beeps at you whenever you type a word it doesn't recognize, whereupon you can lift off the offending word with a single keystroke. At the show, Smith-Corona had one of these typewriters connected to a microcomputer with a program that randomly selected words from among the harder ones in the machine's 35,000-word dictionary; the words were then flashed on a screen behind an unsuspecting victim who, after hearing the word pronounced and defined, had to type it without error. The showgoer who got the longest string of words correct each day before making three errors won a typewriter. Although the event turned out to be less a test of spelling than a test of one's ability to conquer stage fright and shut out the deliberately distracting commentary of the moderator, I'm happy to report that I successfully upheld New England's reputation as a bastion of mental prowess. Now Smith-Corona can start making some money on type wheels, ribbons, and the $105 accessory serial/parallel computer interface. □

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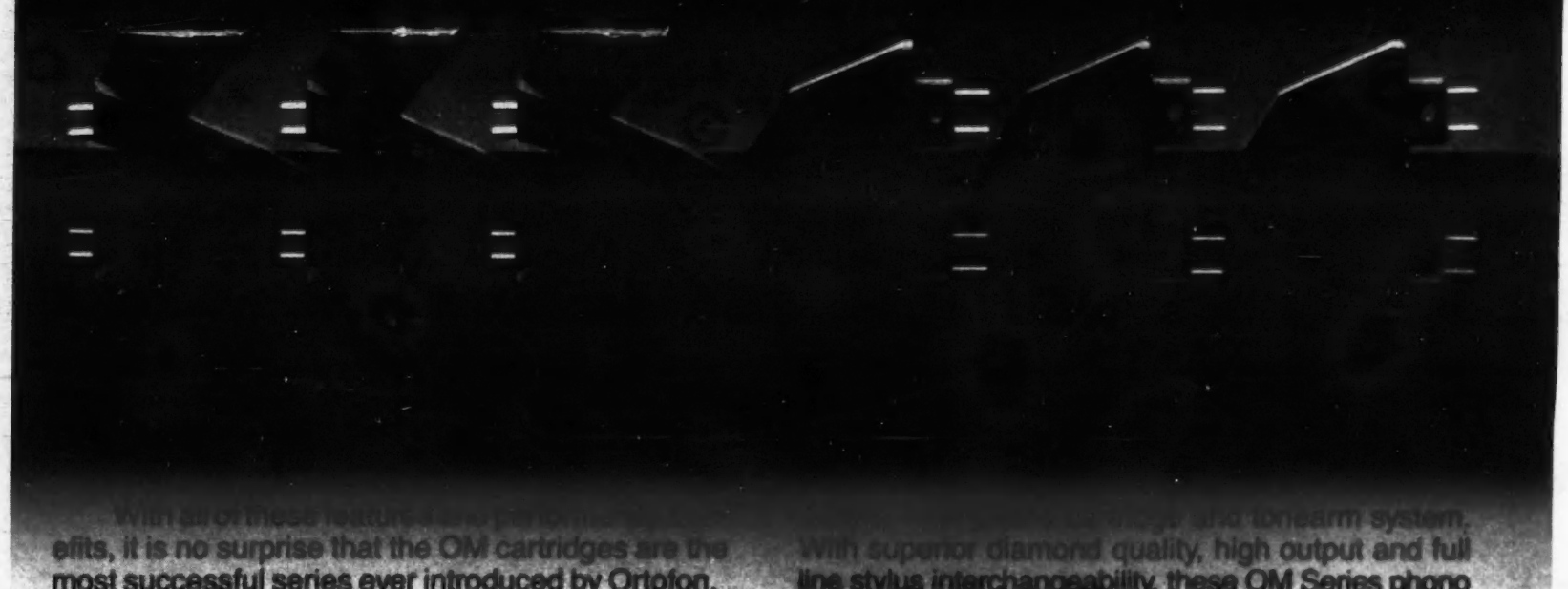

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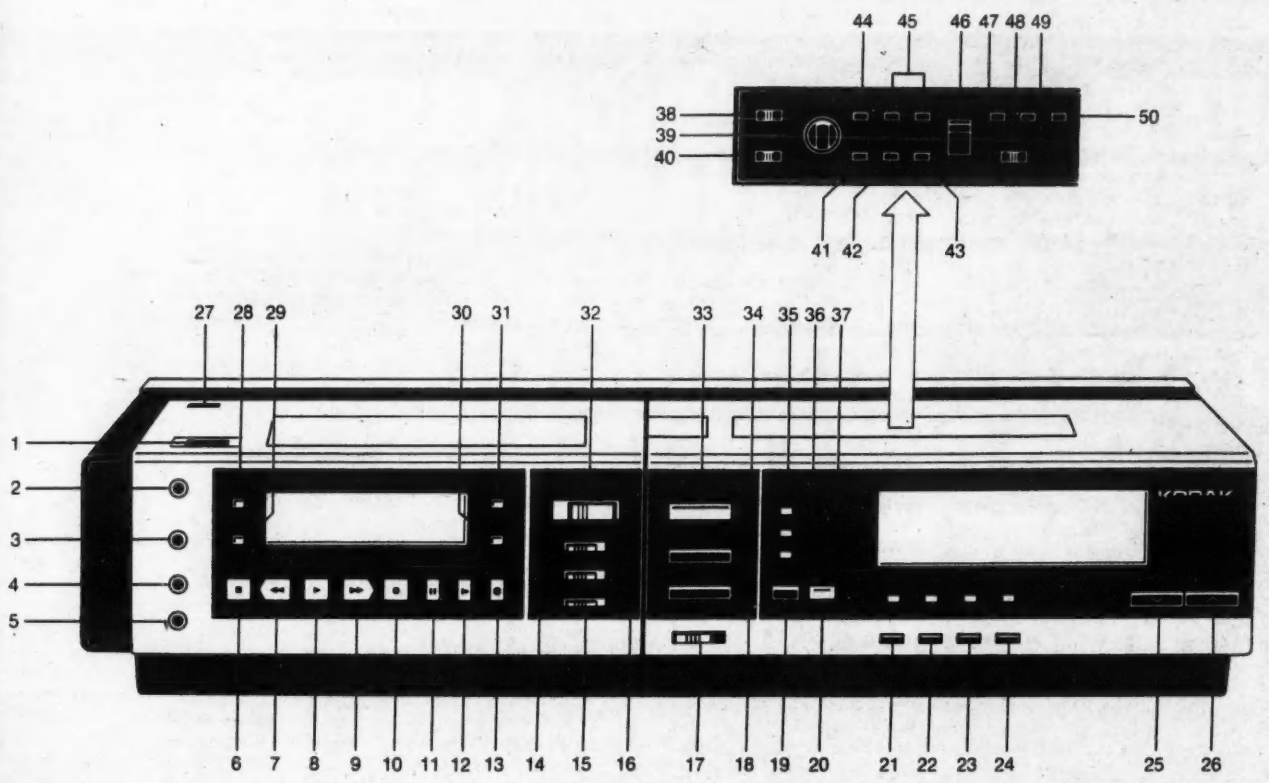

Kodak's 8mm VCR: taking on the big guys

Operating controls for the Kodak MVS-5380 8mm VCR:

1) Eject Button
2-3) Left and Right Mike Input
4) Headphone Jack
5) Video Out Jack
6) Stop
7) Rewind/Reverse Search
8) Play
9) Fast Forward/Forward Search
10) Record
11) Pause/Still
12) Frame Advance
13) Audio Dub
14) PCM Stereo Switch
15-16) Speed Selector (SP & LP)
17) Tuner/Line Input Selector
18) Time Recording Selector
19-20) One-Touch Recording with Delay Option
21-24) Audio Output Selectors (PCM Stereo or FM Monaural)
25-26) Channel Selectors
27) Battery Release
28-29) PCM Multichannel Audio Controls
30-31) Tape Counter Controls
32) Recorder Power Switch
33) Tuner-Timer Power Switch
34) VCR/TV Selector
35) Battery Charging Light
36) Audio II Broadcast Reception Indicator
37) Stereo TV Broadcast Reception Indicator
38) Audio II Programming Selector
39) PCM/FM Audio Mix Control
40) Remote Control Switch
41-45) Tuner-Timer Programming
46) Cable TV Selector
47-49) Channel Memory Selection Controls
50) Optional Monaural Reception Control

Eight is enough

8mm challenges Beta and VHS

by Peter W. Mitchell

There's a new type of tape recorder on the market, and its name is the 8mm. You probably won't want to buy one this year, but its existence has already altered the VCR market. Next year it may alter the prospects for the digital audio tape recorder (DAT) as well.

When the 8mm video format was launched last year, it was seen as a replacement for the 8mm home-movie camera. Consequently, it was first marketed in the US under the biggest brand name in the back-yard photographer's lexicon: Kodak. Compared with film, videotaping is both cheaper (there's no processing cost) and more convenient (tape can be reused, the result can be viewed immediately, and you don't have to set up a projector and a screen). Moreover, the 8mm camcorder (camera-recorder) is much smaller than a conventional (VHS or Beta) camera/recorder, which makes it a more practical item to take on a trip.

But it didn't make much of a splash at first. Although the maximum tape length of 90 minutes was ample for making video home movies, it was too short to tape TV feature films and a far cry from the convenient four- and six-hour running times of Beta and VHS. Picture quality, too, was inferior to that of Beta and VHS. The 8mm video system seemed good only for what it was designed for: back-yard taping.

But at this summer's Computer Electronics Show, the 8mm VCR emerged in a new guise, primarily because of the decline of the Beta format. Previously, one in three new VCRs was a Beta; today one in six is. Toshiba, Sanyo, and NEC, Sony's Beta-format allies, are now producing VHS video decks. Sony, finally convinced that the original Beta format had a limited market, decided to put the full force of its reputation and marketing skills behind the 8mm-VCR format — not merely as a home-movie replacement, but also as the new alternative to VHS. If the 8mm VCR hadn't been developed, Sony probably would have fought longer to maintain conventional Beta as a low-cost alternative to VHS. But the 8mm system emerged from the laboratory at just the right time — when Sony was looking for ways to reinvigorate its perpetual battle with the giant Matsushita/Panasonic/Technics/JVC electronics conglomerate.

At first glance this push for the 8mm seems absurdly ambitious, because VHS is firmly entrenched as the dominant standard for home video. Still, only one-fifth of North American homes have any VCR at all, so there's plenty of room for new products. Sony is adopting a new two-pronged strategy to combat the dominant but technically mediocre VHS format. Superbeta (Sony's new high-resolution version of the Betamax format), with its demonstrably superior picture, will be the choice of the most quality-conscious videophiles, whereas 8mm will be the alternative VCR for the mass market. (Of course there are new super-VHS machines in the works, too, so Superbeta may not have the videophile market all to itself.) An interesting footnote is that the technical standard for 8mm video has already been adopted by 127 companies — including all the VHS manufacturers.

The 8mm system isn't just another VCR. Like Beta Hi-Fi and VHS Hi-Fi, it can also function as a high-quality audio recorder. In fact, an 8mm VCR has no "low-fi" conventional audio track at all. The basic sound in all 8mm VCRs is provided by an audio-FM signal that, as in Beta Hi-Fi, is recorded by the spinning video head. (Actually, it incorporates two improvements to surpass Beta Hi-Fi: an FM dropout compensator for reliable playback in the slow-speed mode, and a synchronized interpolation circuit to prevent the low-level 60Hz hum that can arise in Beta Hi-Fi as a result of the head switching.) So every 8mm VCR, even the simplest model, will have consistently excellent monophonic audio with a wide frequency range, flat response, virtually no flutter, and an 80dB dynamic range (aided by a built-in dbxlike two-to-one noise-reduction compander).

The startling news is that the 8mm format also includes an optional provision for recording stereo digital sound with the video and, in the latest wrinkle, an audio-only mode in which up to six two-hour digital stereo recordings can be accommodated on one tape. This appears to have been Pioneer's idea: to make 8mm into a dual-purpose product for recording both video and digital audio, just as Pioneer's LV/CD combo machine plays both LaserVision video discs and audio-only compact discs.

The greatest attraction of the 8mm VCR is its compact size. A VHS cassette, which contains half-inch tape and two reels, is as large as a good-sized book, and a typical VHS recorder is a rather bulky affair. By comparison, the 8mm video cassette is startingly small — nearly the same size as an ordinary audio cassette — and it fits easily in a shirt pocket. Sony's portable 8mm VCR weighs only two pounds and at three by six by eight inches could be carried in a jacket pocket. It is as amazing a feat of miniaturization as the pocket-sized CD players from Sony and Technics. A complete 8mm video recorder (including built-in tuner-timer) is smaller than many audio-cassette recorders and can be stacked conveniently with your audio components.

The 8mm VCR has a 40mm head drum (half the size of a VHS drum) and uses high-coercivity metal-particle tape running at 1.43 centimeters per second (.56 inches per second). The tapes come in standard lengths of 30, 60, and 90 minutes. A two-hour cassette will also be available, perhaps with an evaporated-metal coating. Two-speed machines will offer doubled running time but will lose some picture quality.

The first 8mm systems introduced last winter were not impressive, but the new Sony- and Matsushita-made Kodak 8mm VCRs have virtually the same picture quality as a VHS deck. And the 8mm incorporates two engineering refinements that weren't available when the VHS and Beta formats were designed a decade ago. One is a pilot tone system that provides reliable tracking with no need for a manual tracking control. The other is a "flying erase head," a bit of jargon that means the following: when a new recording is started, the heads automatically align themselves with any existing tracks on the tape, producing clean edits without the usual interval of video noise and rainbow moiré effects.

Why wouldn't you want to buy one right away? High price, for one thing: the first-generation 8mm machines and blank tapes cost about twice as much as their VHS and Beta counterparts. Eventually, mass production should bring the 8mm VCR down to a comparable price (8mm's metal tape costs twice as much per foot as regular tape, but the smaller cassette uses less tape and has one-third fewer moving parts than a VHS cassette has, so

Sound advice

The key to the inclusion of digital audio in the 8mm VCR is seen in the accompanying illustration of the signal as it is formatted on the tape. In VCRs of all types, the video signal (with the hi-fi FM carrier, if any) is recorded on a diagonal swath across the tape. During each full revolution of the spinning head drum, a full TV frame is recorded on the tape on two adjacent tracks corresponding to the two alternating A and B video "fields" that are interlaced on the screen to form a full video frame. Thus a single diagonal track, corresponding to one TV field, is recorded during each 180-degree half-turn of the head.

In VHS and Beta machines, the tape is wrapped about halfway around the head drum, and each track corresponds to just 180 degrees of head rotation. But in the 8mm format, the tape is wrapped more fully around the head drum, and recording is done during 216 degrees of head rotation. Since only 180 degrees is needed for each video frame, that leaves 36 degrees at the end of the track (corresponding to 3.3 milliseconds of time) in which a burst of digital data can be recorded. Thus the digital audio signal is not recorded continuously but in intermittent bursts. During the half-rotation of the head (16.7 milliseconds), when the video signal is being written on the tape, the digital audio is stored in a buffer; then it is dumped onto the tape in a 3.3 millisecond burst at the beginning of the next diagonal track.

Now, if you are not recording video and you want to use the 8mm format as a pure-audio recorder, the remaining five-sixths of each diagonal track is empty. So, after you have recorded a tape with digital audio in its standard location in the first 36 degrees of each track, you can rewind the tape, press the button for "Track 2," and record another full-length program of digital audio on the next 36-degree segment of each track. Repeating this process, you can record up to six separate two-hour digital stereo programs on one tape — and store the entire 24-hour Wagner *Ring* Cycle on two cassettes!

This is confusingly called the "multi-channel" PCM format for 8mm tape. In contrast to analogue tape, where each track normally contains the signal for one stereo channel, in video-based digital recorders each "track" contains the digital code for two stereo channels. So the 8mm PCM format accommodates six separate (but not simultaneous) two-channel stereo recordings. It is not true multi-channel recording; you can't tape four (or 12) channels of sound in one pass.

In playback you can select any of the six digitally recorded tracks. (More language confusion; the six tracks, each containing a two-channel stereo recording, are successive 36-degree segments of each diagonal track on the tape). You can switch quickly from track to track, but you can't play all 12 channels simultaneously.

If an 8mm VCR can play movies, tape TV programs, and do double duty as a long-playing digital audio recorder, too, the market for a

Continued on page 10

the net cost should come out about the same). The second drawback of 8mm at present is the paucity of pre-recorded movie tapes for purchase or rental. It will take a year or two for a substantial library of movie tapes to be produced in the 8mm format.

Furthermore, though the 8mm VCR can be used for pure-audio digital recording, it has limitations that will arouse the scorn of many audiophiles. (See the accompanying report on the technical details of 8mm's digital audio, page 8.) If high-quality audio-only recording is your main interest, you may want to wait and see whether a product designed explicitly for that purpose will come to market next year.

Introducing the DAT

When the Philips/Sony Compact Disc was adopted as the standard digital audio-disc format four years ago, it seemed clear that the next step would be to standardize a companion format for digital audio tape (DAT). The goal was to develop a home-use digital recorder whose sonic quality equaled that of the CD. Philips engineers designed an efficient open-reel digital recorder running at 3.75 inches per second (ips), but the major Japanese companies insisted on using cassettes rather than a bulky and inconvenient open-reel system.

The crucial selling point in favor of digital cassettes was that they could be made to work in a moving automobile. A digital cassette was needed for in-car use because it was thought that the vibration of a moving car might prove too severe for CD players. In annual sales volume, the car-stereo market has become fully as large as the home hi-fi business, so there was a powerful economic incentive to develop a digital audio product for that market.

A second point in favor of the digital cassette was that optical-disc technology is better suited to home playback than to home recording. The technology for optical recording is obviously well in hand, and "write-once" compact disc recorders could be mass-produced for around $1000 apiece if a sufficiently large market existed for such a device. But that market is small; we have grown accustomed to the convenience of tape recording, and few people would ever be likely to buy a recorder that could not erase and re-record. (Exception: the compact disc can hold about 500 megabytes of computer data — a greater capacity than that of a thousand floppy disks; you could use a one-write recordable CD for weeks or months without filling it up.) Erasable optical audio discs exist in the laboratories of Philips and Matsushita, but as a practical product, the home-recordable audio CD is still several years in the future. For this decade at least, tape is the only digital recording medium for audio that can be made economically enough for home use.

The DAT project succeeded — too well. By late 1982 one group of manufacturers (including JVC, Sanyo, Kenwood, and Technics) had produced designs for a working digital cassette recorder that employed a stationary head and a mechanism similar to that of a conventional analogue cassette recorder. This system could have been on the market two years ago, except for one problem: another group of Japanese companies developed a second digital audio-cassette system that was incompatible with the first. This one used a rotary-head design, like that of a video-cassette recorder.

The large industrial cartels in Japan don't like market competition based on incompatible technical standards. (The battle between the Beta and VHS video-cassette formats is seen as an unfortunate mistake that confused consumers and retarded the development of the VCR market.) For the good of the industry, competitive battles based on technical standards should be waged in laboratories, not in retail stores. The Japanese prefer to have representatives of all companies form a committee to evaluate the proposed systems and choose one for the entire industry.

The worldwide market success of the compact-disc system testifies to the wisdom of this approach (though some audiophiles feel that the technical performance of the CD is only marginally adequate for hi-fi and that the standards for its digital coding were shoved down our throats). Consumers who are now stuck with obsolete Selectavision CED videodisc players from RCA perhaps wish that a similar unifying standard had been adopted for the video disc; but in the US the antitrust laws forbid such collusion among manufacturers before products are marketed.

The Japanese DAT committee was supposed to choose the superior DAT format and announce its recommendation by mid 1984. If it had done so, digital recorders could have been on store shelves by mid 1985. But in January 1985, after many months of wrangling, the committee announced that it could not choose. The pros and cons of the two formats were so strong and so well balanced that neither system was clearly superior. By mid 1985 majority sentiment seemed to favor the rotary-head design, but it appears that a final choice won't be made until sometime in 1986.

It's just possible that neither 16-bit DAT format will survive. Although the audio divisions of the major Japanese companies have been wrestling to choose a DAT, the video divisions of the same companies have agreed on the new 8mm format for both video and digital audio, and it's already in production. It is going to be promoted heavily, and it could become the standard — at least for the mass market, though probably not for audiophiles.

Two choices

The design of the proposed fixed-head DAT is mechanically similar to that of an analogue recorder, with the tape passing in a straight line over the stationary head at a speed of 1.875 inches per second. The tape has a dense metal-particle coating. The cassette has openings for three separate heads (erase, record, play) to allow off-the-tape monitoring of the recorded signal. Instead of the usual two tracks in each direction on the tape, there are 22 each way to accommodate the two million bits per second that are required for 16-bit PCM recording. Thus, there are a total of 44 tracks, each .0026 inches wide, across the one-eighth-inch width of the tape. Thin-film technology was used to create recording and playback heads containing 22 gaps in a line; each gap is 0.3 micron wide and 65 microns long. The tape-transport mechanism must be considerably more sophisticated than that in an analogue deck to keep the tape precisely aligned with the microscopic head gaps during recording and playback.

The proposed rotary-head DAT looks like a miniature VCR, with a spinning head drum that writes diagonal tracks on a slowly moving tape. The preliminary design includes a 30mm head drum rotating at 2000rpm to produce an effective writing speed of 120 inches per second, while the tape crawls along at .72 centimeters per second (.3 inches per second). But in the interest of standardization, the rotary DAT may be changed to employ the same tape transport as the 8mm VCR. A continuous running time of two hours is obtained with a tape package that is even smaller than a conventional audio cassette. The width of each diagonal track on the tape is 12 microns (.0005 inches), about 30 percent narrower than the 19-micron track of a VCR operating at the Beta-III or VHS EP speed. As in a VCR, an electronically controlled servo system is used to align the head with the narrow recorded track during playback.

The choice between these two DAT formats can't be based on their sonic performance because both formats will use essentially the same analogue circuits and similar digital coding. (The digital coding, as in the CD, is based on 16-bit linear PCM. Originally, the sampling rate was to have been 44.1kHz, like that of the CD, but it can be set at 48kHz to prevent direct digital-to-digital copying of CDs.) With sonic differences officially ruled out, the choice between the two DAT formats was to have been based on manufacturing cost and on the practical differences in how the machines would be used.

The rotary-head approach has the clear advantage of a two-hour uninterrupted running time, a major benefit if you're taping operas or full-length symphony concerts. On the other hand, if your recording consists of four-minute popular songs (which, presumably, is what most potential buyers want), it would be annoying to have to wind through a two-hour tape to get to the one song you want to hear. Fixed-head digital recorders are currently limited to about 30

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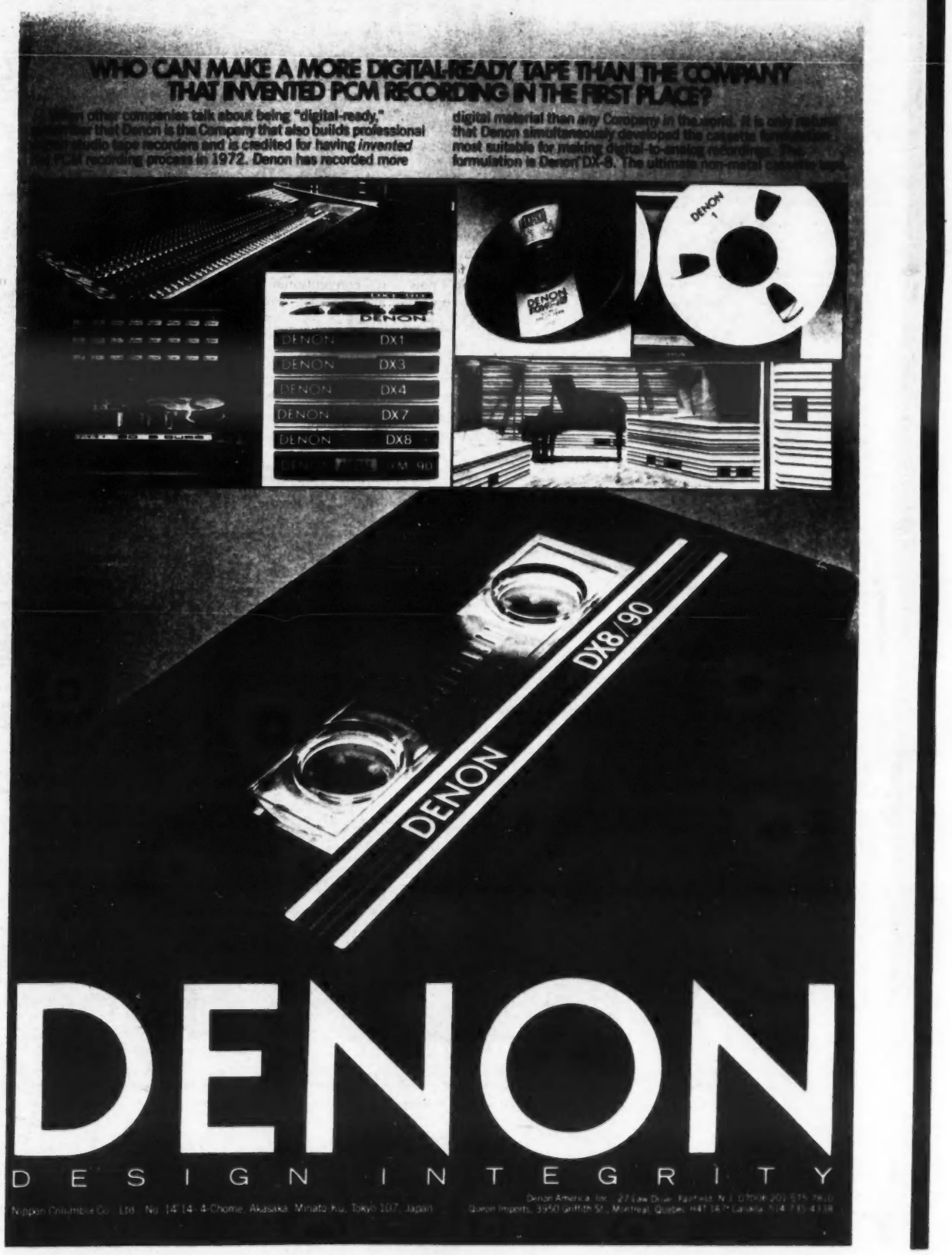
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Sound

Continued from page 8

separate audio-only digital tape deck may be very small indeed. But is the 8mm VCR really up to the task? Does all this sound too good to be true? Well, yes, there is a hitch. As a digital audio recorder, the 8mm VCR is not the equal of a pure-audio 16-bit digital audio recorder. It does not exactly duplicate the sound of a CD.

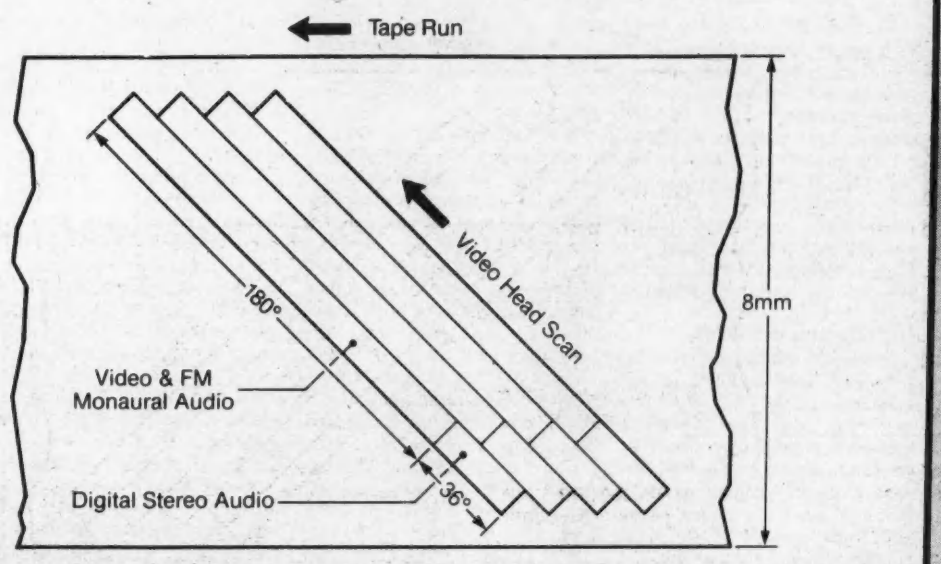
The bad news for audiophiles concerns the digital sampling and coding. It uses eight-bit codes instead of the 16 bits used in the CD and DAT and a sampling rate of only 31kHz instead of 44kHz. The lower sampling rate means that frequency response is limited to 14kHz — a 10th of an octave lower than the 15kHz limit of stereo FM radio.

The eight-bit coding and 31kHz sampling rate will bring hoots of derision from those audiophiles who find the 16-bit coding and 44kHz sampling rate of the CD just barely adequate for hi-fi. Actually, there is seldom any significant energy above 14kHz in musical sound, and most adults couldn't hear it if there were. As for the eight-bit coding, it is not the sonic disaster that you might expect. It has two major consequences: an irreducible minimum of .4 percent distortion and a maximum signal-to-noise ratio of 48dB.

To deal with the latter, 8mm VCRs contain an internal compander to compress the dynamic range of the audio signal during recording and

Helical Track Configuration for 8mm Video

Video & FM Audio & Digital Stereo Audio



8mm

Continued from page 9

minutes in each direction, too short for many classical-music listeners, but both the shorter length and the fixed-head design make it much easier to cue the tape to a desired location.

A stationary-head digital recorder can be equipped with off-the-tape monitoring, so dropouts or other recording faults can be detected while a recording is being made (tape monitoring is impractical in a rotary-head machine). This is not a trivial point, as users of present-day digital recording systems have learned to their dismay. Analogue tape dropouts are "soft" faults: the level or tonal balance of the sound is momentarily altered, usually in only one channel at a time, but you can continue to enjoy the music. In a digital recorder, small dropouts can be completely restored by the error-correction logic, but any dropout that exceeds the circuit's correction capacity becomes a "hard" fault. The result is either a loud burst of noise or a total interruption of the sound as the player goes into muting, breaking the flow of the music. Without off-the-tape monitoring, you won't know there's a problem until the recording is played back — which may be too late. For this reason, important digital recordings are always made with two decks running in parallel.

Does the importance of long running time outweigh the convenience of easy cueing and the peace of mind that tape monitoring can provide? I agree with the DAT committee: it's a difficult choice.

In theory, pre-recorded digital tapes for fixed-head playback could be mass-produced at low cost by a high-speed duplication process similar to that used for analogue tapes, though the practical difficulties with this project would be formidable. On the other hand, it may be possible to employ a magnetic printing process (like that used in Sony's Sprinter, which duplicates an entire two-hour Betamax videotape in five minutes) to mass-produce digital rotary-head tapes. So there's no clear winner here.

The DAT won't be cheap. A digital cassette deck must contain essentially the same digital-to-analogue playback circuitry as a compact-disc player, plus an equally complex array of circuitry on the recording side: anti-aliasing filters, analogue-to-digital converter, coding for error correction, the same analogue input circuitry as in an analogue recorder, plus heads and a high-precision tape-transport mechanism. My guess is that digital cassette recorders will initially cost upward of $1000. Mass-

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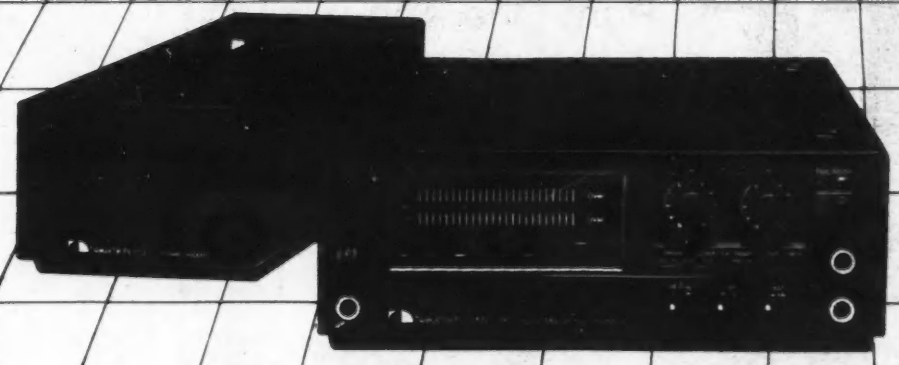

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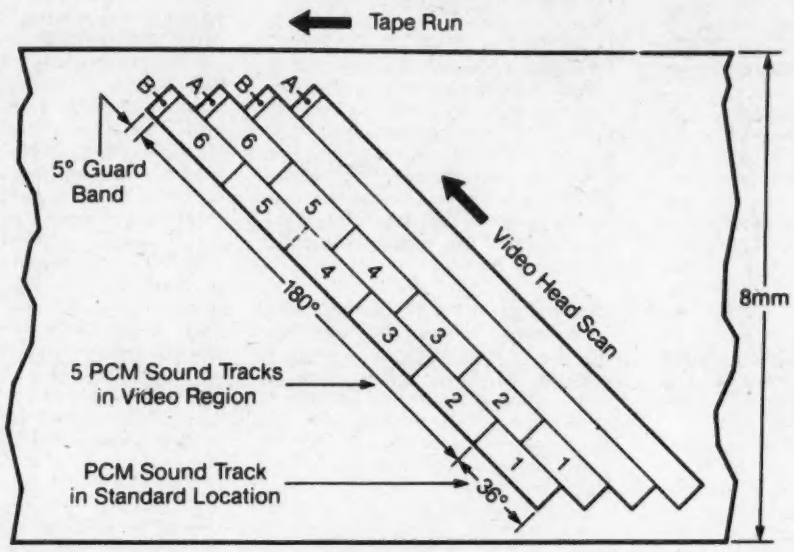

re-expand it in playback. As we noted earlier, a similar — perhaps the same? — compander is used with the "hi-fi" audio-FM mono soundtrack in the 8mm VCR. It has a two-to-one compression characteristic, similar to that in dbx noise-reduction equipment, increasing the useful dynamic range of the PCM system to better than 80dB. (The compressor brings a minus-80dB input signal up to minus 40dB for recording, well within the 48dB dynamic range of the eight-bit digital code.)

Of course, there's no free lunch, and companders usually have audible side effects. In this case, the expected side effect is "noise-pumping" (hiss varying up and down in level with the music), but no misbehavior was audible in the Sony demonstration that I heard. Evidently the designers did their job well.

The highs in that demonstration seemed a bit glassy, but otherwise the sound was astonishingly good, considering the eight-bit coding and 14kHz limit. It has the standard virtues of digital audio, of course: consistently flat frequency response, stable stereo imaging, and absolutely no flutter. The bottom line is that, though it clearly isn't a perfectionist audio-recording system and may not be able to make an indistinguishable copy of a CD, it's probably good enough to please most people most of the time.

Only the picky audiophiles among us will insist on something better. That better alternative exists — the 16-bit DAT — but it may never make it to market.

— P.W.N.

production economies of scale may bring prices down later, but a DAT will always cost at least twice as much as a CD player.

Is the consumer market for digital tape recording large enough to support two incompatible formats? Not likely. The market may not be large enough to justify even one DAT system now that CD players have been made small and vibration-resistant enough for portable and in-car use. Why go to the bother and expense of copying a CD onto a digital tape for on-the-go playback when you can play the CD itself everywhere? There are other potential uses for a digital recorder, but they may not add up to a large enough market to justify manufacturing the product.

No need to wait

High-quality digital recording is available now. The $1700 Sony PCM-F1 is a 16-bit semi-professional digital recording processor whose performance equals that of the large mastering recorders from which CDs are made. Sony recently introduced a consumer version, the PCM-501ES, that retails for only $750. If you combine the 501ES with a no-frills Beta VCR at a discount price of $250, you'll have a fine 16-bit digital recording system for $1000 or less. (After converting the audio signal to a digital code, the processor formats the code as a pseudo-video signal for recording on the VCR.) I haven't compared the sound of the PCM-501ES with that of the PCM-F1, but in a lab test the two units performed identically in every measurement. The 501's only obvious flaw is the slow response of its meters, which don't track peak levels accurately.

Sansui, Technics, and Aiwa also make digital recording processors for less than $1000, and they are equipped with circuits that improve the reliability of playback decoding with VHS machines, especially in slow-speed operation. These models, however, are limited to 14-bit coding and don't have dithering to prevent quantizing distortion at low levels. Therefore, a Sony processor is a better choice for recording that will include very low-level signals.

There's a simple way to get around these limitations: use a dbx 122 or 124 noise-reduction unit. Either will increase the useful dynamic range of the 14-bit processors to well over 100dB, and the two-to-one compression of the input signal will raise even the faintest hall ambience to a level of −60dB, far above the processor's −84dB quantizing noise. You'd be amazed at how good dbx noise reduction can sound when its performance isn't being compromised by dropouts, modulation noise, and the other flaws of analogue tape. □

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Tape tech

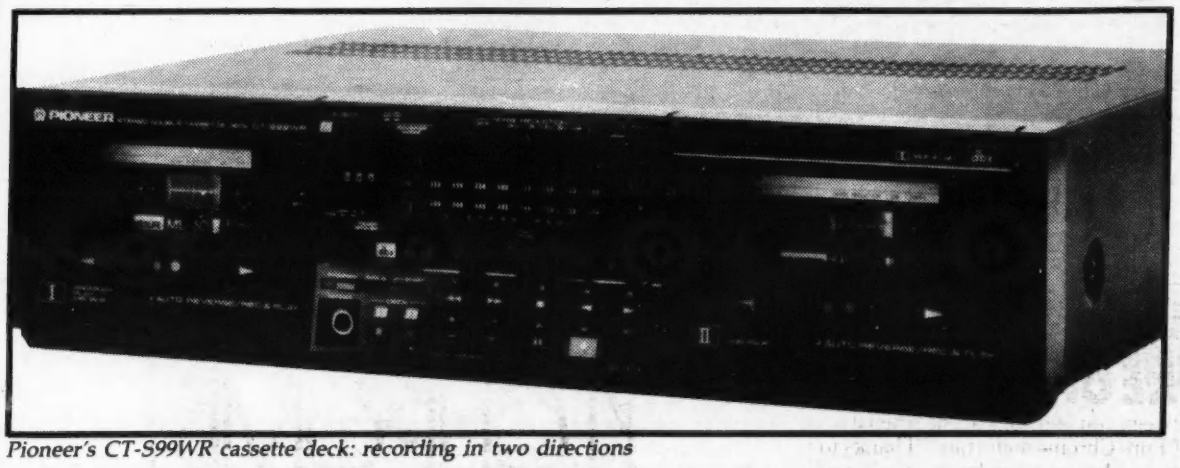
Cassettes grow up

by Mark P. Fishman

One thing has been true ever since the invention of Edison's cylinder: consumers have wanted the capacity to record in the high-fidelity equipment of their time. The cylinder itself was used in the first phonograph in 1877, which Edison originally intended as a recording medium. Now cassette decks are more popular than turntables in new-equipment sales. In fact for over a year, sales of prerecorded cassette tapes have eclipsed those for LPs — the first time any new recorded product has beaten the disc since it was introduced in 1887. But the incredible growth of the cassette medium is due largely to its recording abilities, which have improved mightily in just a few years.

The driving force behind this improvement has been necessity — the need to keep up with the sound quality of the sources that cassettes are being used to record. Records are better than ever, and there's now a well-deserved respect for live-concert broadcasting on FM. But without doubt, the greatest challenge to the cassette's success at capturing sound — in both frequency and dynamic range — has come from the compact disc.

Despite the advantages of the compact disc in sound and durability, on all but a few CD players, we are stuck with the producer's preprogrammed selection of songs and sequence. The cassette, on the other hand, allows us to rearrange the programming — and to carry it around with us. The Sony Walkman, the ultimate portable cassette player, changed our idea of where music belonged and, by introducing the masses to headphones, made us more critical listeners. Headphones exposed the weak spots of the cassette in noise level, frequency response, and image stability, making it clear that the tape was handicapped by its narrow width and slow speed. Manufacturers then set about overcoming its faults, and now the market supports many new, improved cassette products, including three noise-reduction systems, three tape types, auto-reversing decks in both playback and record, and decks that record but don't play back at double-speed. Let's try to sort them all out.



Pioneer's CT-S99WR cassette deck: recording in two directions

Manufacturers have tried to attack the related problems of dynamic range and signal-to-noise ratio by increasing maximum signal levels at all frequencies and lowering noise levels. In the process, they have improved old tape formulas and developed new ones. Among the major advancements in tape since the cassette was introduced in 1965 has been the introduction of chromium dioxide (CrO_2), followed closely by the so-called chrome equivalent, such as TDK SA and Maxell UDXL-II. These "Type II" tapes, as they are called, can record much more high-frequency energy than early "Type I" (iron oxide) tapes. The Type II also uses a different playback equalization to push the noise level down a bit as well.

Another major improvement was the creation of a tape based on pure metal particles, instead of on oxides of metals. Pure metal vastly increases the maximum level of all frequencies, not just treble. Because it was almost impossible to erase, metal tape also forced improvements in other parts of cassette decks, particularly the heads and electronics. This tape became known as "Type IV."

These three — Types I, II, and IV (as standardized by the International Electronics Commission), are accommodated by the three switch positions you'll find on today's decks. But what happened to Type III?

Type III was a hybrid: a tape made of a base layer of iron oxide, with a surface layer of chromium dioxide. This "ferrichrome" tape tried to take advantage of the lower distortion and good midrange behavior of Type I, while also getting the improved treble of Type II. But it was expensive, and its performance did not live up to its promise.

Type IV metal tape hasn't really taken the market by storm, either. Like its predecessor, it is too expensive — over twice as much per cassette as a modern Type I or II — and there are less expensive ways to get the same improvements in performance. Also, Type I tape has been improving so steadily over the years, in competition with other tapes, that today's top-of-the-line Type I tape may be your best buy. It is low in inherent noise, its maximum output levels are comparable to those of Type II tapes, and almost all hi-fi cassette decks can take full advantage of it.

Manufacturers have also attacked sound improvement with electronic trickery — by improving noise reduction systems. The original cassette noise-reduction system, Dolby B, is no longer merely another desirable feature; these days, it's a necessity. The least expensive decks have it, and just about all prerecorded tapes use it. By providing a 10dB reduction in apparent noise levels, Dolby B helped make the cassette a viable hi-fi medium. For today's signals, however, that extra 10dB isn't enough.

To provide, at a lower cost, the dynamic range available from the combination of expensive metal tape with Dolby B, a noise-reduction system would have to offer at least a 20dB reduction in apparent noise levels. Enter Dolby C. This system not only offers the 20dB improvement in apparent signal-to-noise ratio, it also adjusts the signal to reduce distortions caused by recording high frequencies at high levels, so maximum output can be increased. Dolby C has been around long enough that it can be found on all but the least expensive cassette decks (even a few car cassette players are beginning to appear with Dolby C). Since you'll probably use this only for making your own tapes, the paucity of pre-recorded tapes produced with Dolby C should not be an issue.

The other major noise-reduction system for cassette decks is made by dbx and, to confuse matters, is also called type II. Their type I was a professional system used for multitrack open-reel; the dbx type II is set up to work with consumer decks and signals. It is a full-range compressor/expander system so, unlike the Dolby B and C, it does not require that the deck be calibrated to match record and playback levels exactly. On the other hand, although you can stand to listen to Dolby-encoded tapes without decoding them, undecoded dbx sounds awful. That's part of the price you pay for more than 30dB of apparent noise reduction. (The other part is a slight tendency for tapes to breathe, or change the noise level audibly, with some music.)

Until recently, a selling point for a cassette deck with dbx noise reduction was its ability to decode, without taping, a dbx-encoded LP record. Dbx, however, has stopped making these records, and now that CDs are here in force, no one else is likely to make them. So dbx is back to being purely a tape noise-reduction system.

Many new cassette decks also have a switch for something called "Dolby HX Pro," or sometimes just "HX Pro." The HX stands for "headroom extension." The system works only during recording to improve the maximum level capability of any tape used. By combining Dolby C, HX Pro, and a good modern Type I tape (such as TDK AD-X), you can more than match the performance of the metal-tape-Dolby B combination, at less than half the price. And I haven't found the source material that requires a stronger performance than that.

* * *

In the jargon of the recording industry, the separation between the noise floor and the maximum-output ceiling is called the "window." To make good use of the window, you must be able to position the signal accurately within it. Ideally, you want to record near the ceiling, to keep quiet passages off the floor, but you also want to avoid bumping your head by trying to record too high. (That's why it's called headroom.)

New metering systems that respond better to the signal have been introduced to help you stay within the optimum window. Essentially, the older moving-needle analog metering system has been replaced by rows of colored LEDs (light-emitting diodes). Because the LEDs are usually placed parallel to each other, you can watch both channels' metering simultaneously.

Some decks actually change the way they drive their meters depending on the type of tape you are using, so in recording, the point at which overload is registered is relative to a tape's capability and really means "too much signal" for that particular tape. Cassette decks from Bang & Olufsen, a Scandinavian company noted for the aesthetics of its hi-fi equipment, do this, for example, and their metered readings on playback (which reflect actual output, not a value relative to the tape's capability) don't always correspond to those seen during recording. Usually, however, it is important to be able to calibrate the deck so that the tapes' playback and recording levels are equal. This is because both Dolby B and C noise-reduction systems can be fooled into misbehaving audibly if they don't get the signals at the same levels during recording and playback. Where once you were expected to have your service technician or dealer open the cassette deck and calibrate it for a particular brand of tape, which you then had to stick with, now there are lots of adjustments you can make yourself.

This may sound more like a bother than an asset, so let's talk about the built-in features that help you take advantage of all this performance, along with some features that have nothing to do with sound. Starting a few years ago, as microprocessors became cheaper and more available, cassette-deck manufacturers began to offer decks that could adjust themselves automatically for optimum bias, sensitivity, and sometimes even record equalization. This helped to get consistent performance from cassettes of different tape types. But the adjustments could be coarse: only eight settings for bias level, for example, would mean that sometimes the optimum setting fell in between two of the automatic positions.

The latest generation of decks often incorporates manual fine adjustments, so you can tweak the result of the automatic procedure. In the lower price ranges, though the automatic adjustments are missing, you still get the manual fine tuning, together with built-in tone generators to help you set the deck up. The process of adjustment is simplified considerably in a deck that has three separate heads — erase, record, and playback — because you can monitor the effects of the adjustment as you make it.

If these calibrations help you make the best possible recordings, what about playback of pre-recorded tapes or tapes made on a different deck? For optimum playback, after you've set the equalization and noise-reduction switches correctly, there's a mechanical adjustment, but you aren't supposed to go near it. It is called "head azimuth," and it ensures that the playback head is correctly lined up with the high-frequency information on the tape. The problem is that, because the cassette housing doesn't control the motion of the ⅛" tape very well, the tape is constantly sliding and skewing as it passes across the head. Even a well-aligned fixed head can't be entirely accurate more than a fraction of the time.

Note that I said fixed. Nakamichi, a Japanese company that has introduced many tape-transport innovations, offers a unit (called the "Dragon") that uses its microprocessor to adjust the playback head continuously while playing the tape, keeping azimuth nearly perfect at all times. Not only does this improve the tracking of the noise reduction and result in better high-frequency response, it also helps to stabilize the stereo image because the phase relationship of the two channels stays constant. Nakamichi has also pioneered a novel approach to bidirectional tape decks (models RX 202, RX 303, and RX 505): one of their units actually removes the cassette from the well of the deck, turns it over and reinserts it.

Most decks from other manufacturers, however, take the traditional approach of simply reversing tape motion at the end of a side. In the past, this feature has usually only been available in playback because you need an extra erase head to be able to record in the reverse direction. Head technology has advanced to the point where the small, originally functionless openings in the cassette shell can accommodate these heads. Therefore, you can now find auto-reversing decks that record in both directions.

One such deck is the new Pioneer CT-S99WR, introduced this past June at the Summer Consumer Electronics Show. For $460, you get auto-reverse in both record and playback, Dolby B and C, and dbx; and you get all this in two transports.

This brings me to the last thing I'm going to mention: dual-well cassette decks. This started as a gimmick — one well was for recording, the other for playing back — to allow tape dubbing in one machine, but as the Pioneer CT-S99WR shows, the feature has grown up. As a copying system, these decks can run at twice the normal speed. The electronics have been designed to handle twice the normal frequency range so that very little is lost and a great deal of time can be saved. Some units even copy both sides of the tape in the same pass, increasing copying speed four times. Used as an ordinary recorder or player, one of these systems amounts to two cassette decks and a sophisticated timer for the price of one ordinary deck.

That Pioneer, for example, can be programmed to record (or play) both sides of two cassettes, in sequence, for a total of over three hours of music. And one new unit, the $330 DT-156 from Mitsubishi, can take seven cassettes in one transport, program up to nine selections from each side and play them or, at twice the normal listening speed, dub them.

So there you are. At about the price of a basic deck of five years ago, you can now get 20dB more dynamic range and cleaner, less distorted sound in a package that is easier to use and does more things, more reliably. The three noise-reduction systems give you compatibility with everyone else's cassettes; the three-tape-type capacity — even if you don't use all three — indicates that the deck can handle the more common tapes with ability to spare; the two transports give you extra playing time; and the bells and whistles are an added special effect, especially when you turn out the room lights. □

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Coppola's Cotton Club*: the first with Macrovision*

To catch a thief

A new process to thwart video dubbing

by M. Howell

The Cotton Club may have gotten mixed reviews as a movie, but *The Cotton Club* video cassette could be the harbinger of a major shake-up in the world of home video. The controversy has nothing to do with debates over Francis Ford Coppola's direction, Richard Gere's screen presence, or the reunion of the Hines Brothers. No, the industry is buzzing about *The Cotton Club* because it is the first video tape to be encoded with Macrovision — a new process that prevents "casual" consumer taping or, to put it bluntly, video piracy.

To use an analogy, it's as though the recording industry has discovered a way to press a record album so that when the consumer tries to transfer it to cassette, the tape will come out garbled. If the Macrovision process works as expected, it could virtually eliminate a recent development in American social interaction: the friendly get-together of neighboring VCRs. The now-common practice of renting a tape and making a copy (dubbing) for one's own tape library will gradually come to an end. The consumer will be limited to purchasing the tape outright or hoping it's available at the local rental outlet.

Of course, the industry sees this not as an inconvenience to the consumer but as a way to thwart thieves. And it has a point. Video cassettes are now a billion-dollar-a-year industry. Reg Childs, the president of Embassy Home Entertainment, which released the home version of *The Cotton Club*, estimates that illegal duplication of cassettes accounts for between 10 and 20 percent of the market, which translates into a loss of up to $200 million dollars per year for the industry. More significant, he says, is the fact that "worldwide illegal duplication could run as high as 50 percent. I know that there are some countries that we can't even license because illegal duplication is so widespread."

Manufacturers and distributors break their losses from illegal copying into two categories: counterfeiting — when a tape pirate makes copies and sells them to unwitting or unscrupulous consumers; and piracy — when someone makes a copy of a commercially released video tape for himself or a friend. Somewhere in between is the practice of "backroom duplicating," whereby a retailer runs off a few dubs to give the store additional rental copies of a given title.

In the past manufacturers were concerned solely with counterfeiters. A sale to a rental store was still a sale, and few consumers were tape-crazy enough to purchase two $500 VCRs just so they could copy some movies. Consumer dubbing was not considered a serious problem. But though the prices of VCRs have dropped (the new Korean machines, under the Gold Star and Samsung labels, retail for less than $300), the prices of the tapes have remained high (except for Paramount, most companies still hold to a list price of $79.95 for feature films). As anyone can figure out, for the price of four films you can set up your own dubbing center. From then on, all you shell out is the money for overnight rental fees (these average $2 to $2.50 per tape) and blank tape (currently about $5 for a brand-name six-hour VHS).

You can always spot the people who've made this calculation: they're the ones renting half a dozen tapes at a crack and chuckling when someone asks, "When will you find the time to *watch* all those?" From the industry's standpoint, the fact that pre-recorded tape prices have held firm while the cost of every other aspect of a home-video system — including machines, blank tapes, and rental prices — have dropped substantially does not justify dubbing. Technically, it is still theft. What Macrovision represents is the first effective way for manufacturers to combat this street-level pilferage.

* * *

Macrovision is the invention of John Ryan and the three-person company he runs in San Jose, California. Ryan's claims for Macrovision are simple: when a company employs the Macrovision process on a tape such as *The Cotton Club*, the first-generation copies sold or rented at retail cannot be duplicated by consumers without a significant loss of video quality. Equally important is the fact that the Macrovision process does not reduce the quality of the first-generation copy as earlier attempts at piracy prevention did. A few years ago, for example, Warner Home Video, and then several other companies, used a process known as Copyguard to discourage dubbing. Unfortunately, Copyguard affected the horizontal hold on the signal and often made the first-generation tapes "roll" uncontrollably, a defect that angered legitimate purchasers. A Warner spokesman acknowledges that the company no longer uses Copyguard.

Macrovision manages to protect the tape by fooling the dubbing deck. As John Ryan explains, "In every VCR there is a system called the automatic gain control (AGC), whose job is to make sure that the signal recorded on the tape remains constant, regardless of the strength of the incoming signal. It's there because a VCR can receive many different signals — from a broadcast, from cable, from a camera, or from another VCR — and all could have different strengths. There's the same sort of device in a car radio, keeping the volume level constant, even though you may drive far from the transmitter or under a bridge. Unless the signal becomes too weak, the AGC keeps a constant signal strength."

Macrovision adds a special signal during the duplication process of tape manufacturing that deceives the AGC system. When you play the tape on your TV, you see nothing unusual. But when you try to dub a tape, it confuses the VCR that is doing the recording. "That VCR measures the incoming signal as two or three times stronger than it actually is, and adjusts the recording down by a factor of three to one or four to one. When the duplicate copy is played back, the picture appears dim, and the horizontal or vertical hold may not work."

Ryan points out that Macrovision is effective with both Beta and VHS formats, even though the two systems use different AGC methods. "The principle is the same," he says. Embassy, however, has used Macrovision only on VHS copies of *The Cotton Club*. You can't copy the film onto a VHS machine from either a VHS or a Beta original, but you can make a copy onto a Beta deck from a Beta or VHS original.

As for Macrovision's potential for industrywide adoption, Ryan states that "there shouldn't be any passed-on costs from the manufacturer." He admits that there is some conversion time involved in modifying the manufacturers' duplicating machines to accommodate Macrovision and says that "Macrovision charges the manufacturer a fee per tape for the use of the process, but that fee is much less than a dollar."

Despite the early adaptation of *The Cotton Club*, commercial movies haven't turned out to be Macrovision's main clients. "Most of our efforts these days are in specialized software markets," Ryan reports. "Things like industrial instruction and how-to tapes. These are tapes where a single copy can run as much as $500, so the manufacturer has a much greater stake in protecting against duplication. In Hollywood there's a wait-and-see attitude. *The Cotton Club* was an experiment. Up until then all our testing had been in laboratories. With that tape we were all of a sudden facing millions of combinations of televisions and VCRs; the results weren't as definitive as we would have liked. And because of Embassy's concerns that the consumer have no problem playing the tape, we used a very weak version of the process."

If Hollywood has a wait-and-see attitude, why did Embassy sign with the untried Macrovision? Reg Childs chalks it up to his company's initiative. "Most of the manufacturers had a chance to look at [a demonstration of] Macrovision last February, but I think we were in a position to make a quick decision. We knew we had *The Cotton Club* scheduled for late April, and we wanted to try the process on a strong-selling title so we could get a good test of the reaction. Once we evaluated Macrovision to be sure there wouldn't be a 'playability' problem on the first-generation cassettes, we decided to go ahead."

Other major manufacturers don't appear to be as concerned over consumer dubbing and are noncommittal about Macrovision. Robert Blattner, president of RCA/Columbia Home Video, says "Any measures that will have an impact on piracy are good." He adds that "only time will tell how successful Macrovision will be." The company has no plans to adopt the system at this time. Blattner stresses that RCA/Columbia is "sensitive to the issue of piracy," but says the company has chosen to concentrate on defeating the mass pirates. "We packaged our cassettes with a Columbia-lady sticker [that is, a logo symbol] that could only be seen under ultraviolet light. Now, in conjunction with American BankNote, we're adding an Authentiseal label, which can be seen by the naked eye, to deter counterfeiters."

Paul Wagner, public-relations director of CBS/Fox, reports that most of his company's enforcement "is aimed at mass pirates trying to make capital gains. It's difficult to police consumer dubbing." Yet Embassy's Childs feels that a start must be made. "We all know that professional pirates are able to get prints of motion pictures at the exhibition level," he says. "Macrovision won't stop the well-financed pirate. It *will* stop the consumer who makes copies of a film for his neighborhood."

Surprisingly, the Disney Studio has also decided not to use Macrovision on its titles, including the recently released classic *Pinocchio*. Disney has always fiercely guarded its full-length animated films and even filed suit against Sony some years back for inventing Betamax and encouraging copyright infringement by home tapers. The company's decision not only to release a jewel like *Pinocchio*, but also not to copy-protect it in some way is a sharp reversal of the studio's traditional stance. Asked for an explanation, a Disney spokesperson said merely that "the studio did not feel the need" to take such steps.

Childs allows that Macrovision may not be the key to increased sales ("What *will* mean more buying is lower prices") but says that the investment in the system is certainly worthwhile. *The Cotton Club* is already selling well, and Embassy officials say that as soon as it can complete the Macrovision conversion on all its duplicating machines, "We intend to use Macrovision on all of our titles." The sense here is that we'll see a lot more Macrovision before we see the prices come down. □

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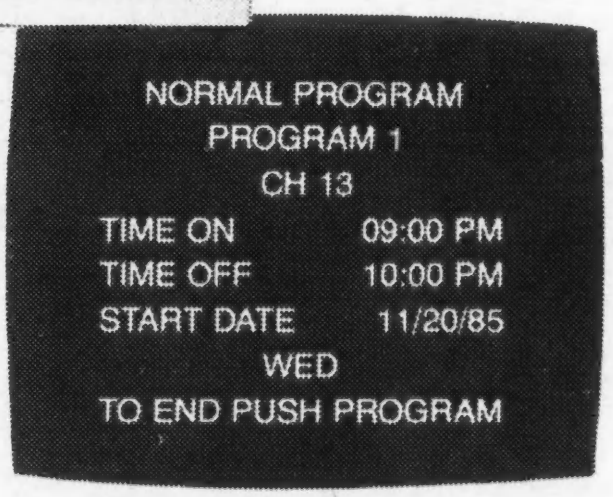

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Pioneer's CDX-1: all decked out with no place to go

Audiomobile

Equipping your car for sound

by Alan Radding

If Boston Garden, with its poor acoustics, is the kind of place you generally go to hear live music, then you may not be tempted to reproduce quality sound inside your car. Nowadays, however, it's possible to equip a car with a stereo whose sound quality far surpasses that of the garden. Stereo music systems for the automobile have improved dramatically in recent years, as quality home-stereo manufacturers have discovered the car-stereo segment of the market. But the problems of reproducing high-fidelity sound inside a moving vehicle have typically been difficult and costly to overcome.

American advances in microelectronics and the development of space-age materials, combined with Japanese ingenuity in consumer applications, have made it possible to enjoy music in its full, undistorted glory almost anywhere, including your car. New car-stereo components are being loaded with microprocessors and related circuitry that can monitor the sound and signal, making instantaneous adjustments in everything from tape-head alignment to stereo-frequency separation. These systems have come a long way from the standard car stereos of the past, with their weak tuners, erratic cassette decks, low-power amplifiers prone to distortion, and small paper speakers.

Even today's factory-installed systems are more advanced than those of a few years ago, and the new high-end car-stereo systems are microprocessor-controlled, often featuring dual-capstan-drive cassette decks with Dolby B, C, dbx, and proprietary noise reduction systems, automatic azimuth alignment, digital quartz tuners, and high-powered amps. Elaborate electronic crossovers direct the proper frequencies to matched pairs of speakers, ranging from subwoofers to tweeters, made with unusual coil windings and exotic materials straight from the aerospace industry. The newest systems even feature graphic equalizers and decks for the hottest new product in consumer audio, the digital compact disc. Such an elaborate sound system does not come cheap — custom installations costing $10,000 are not unusual — but the sound is stunning. Given the acoustics of an automobile, the results are nothing short of remarkable.

To begin with, your car was not constructed to be a fine listening room; even under the best of circumstances, a car's acoustics are challenging. The windows reflect sound, and the seat cushions absorb it. In the limited space of the car, the door panels, dashboard, and rear-window deck must become speaker cabinets. And with all the electrical systems that are already operating inside that cramped space, from ignition to air conditioning, the opportunity for induced electrical noise is greatly increased, and the ambient noise level is probably 30dB to 50dB higher than in your home.

Finally, a car is subject to an excessive amount of heat, vibration, and dirt — the downfalls of any precision electronic system, which depends upon the precise alignment of the tape and head and the rapid dissipation of heat from the speakers.

It might also be argued that driving around Boston does not provide ideal circumstances under which to listen to music. A good car stereo could prove to be dangerous in that you may tend to concentrate on the music rather than on your fellow Boston drivers and the twists and turns of local streets. But we spend a great deal of time in our cars, and during much of that time we're tied up in Boston traffic. At such moments, the ability to listen to your favorite music reproduced by a system comparable to your home stereo may be a necessity, not a luxury. Stuck on Storrow Drive, you need only observe the traffic helicopters circling like vultures to know you aren't going anywhere very soon. That's the time to pop in your favorite cassette.

Or, if you have already made the switch to compact discs, you can slip in your favorite CD. The CD player, with a dynamic range of up to 96dB, eliminates the noise, distortion, and interference to which other auto sound sources are subject. (Tape cassettes, by comparison, have a dynamic range of 50dB, or 70dB with Dolby C.)

The greater dynamic range of the CD can be problematic for car-stereo systems, however. If you play the CD loud enough for its softest sounds to be audible above the noise of the car, the loudest sounds reproduced by the CD can easily cross the threshold of enjoyable or healthy listening. CD has been slower to catch on in cars than in home systems, but more manufacturers are entering the market. Sony currently leads the industry with the CDX-R7, which retails for about $700. Pioneer, Yamaha, Audia, Mitsubishi, and others also reportedly have machines ready for the consumer.

The specifications of the CD player are staggering. Sony CDs store 1.4 million digital bits of information for each second of music. Seventy minutes of music can be contained on a single side. The information on the aluminum disc is read by laser, which never touches the disc's surface, and wow, flutter, and rumble are almost nonexistent. The CD itself is immune to the

Continued on page 18

The discman cometh

The Sony Discman: portable tunes

For those who want the sound of the compact disc when they're away from home but who don't have a car that can take a CD player, there are several portable players currently available, and more are scheduled for release.

The most widely marketed is the Sony D-5 ($299), called the Discman, after Sony's popular personal cassette player, the Walkman. Measuring only 5⅛ inches across, 1¾ inches high, and 5¼ inches deep, and weighing only one pound, five ounces, the D-5 is only a bit larger than the CD itself, though it's too large to fit in your pocket. The machine is powered by six alkaline C batteries or six rechargeable batteries, and makes it possible to enjoy CD sound (90dB dynamic range, a frequency response of 20 to 20,000Hz plus or minus .33dB, with less than .008 percent distortion) anywhere you go. The unit also comes with a 9V DC adapter and power cord, so it can be plugged into a household current.

Although Sony sells a separate battery pack and a carrying case with a shoulder strap, don't expect to slip on the D-5 and go dancing in the streets or jogging down the Esplanade. The Discman is not the Walkman: its laser won't be able to track across the disc properly during animated activity. Under test conditions in the store, the machine performed well when I held it steadily and carefully, and walked around. Slight shaking and jarring caused brief interruptions. With sustained knocking about, the machine simply shut itself down.

The D-5 has a line output that can be used to send the music to your home amplifier or to any in-car system that has an auxiliary input. Given this capacity, some audio enthusiasts see the portable CD player as an easy, low-cost way to bring CD capability into their lives.

To listen to the D-5 on its own, you need headphones, but Sony is bringing out a much larger portable unit, the CFD-5, or "Boom Box," which includes detachable two-way speakers, four watts per channel, a five-band equalizer, an AM/FM tuner, and an auto-reverse cassette deck. The $550 Boom Box is powered by eight D batteries and weighs 17 pounds.

Magnavox will be releasing a unit similar to the CFD-5, which reportedly will retail for $499. Technics and other manufacturers will also be marketing portable CD players, as the race to build this segment of the industry heats up. Sales of CD players are expected to rival those of cassette players in five years, according to some industry reports.

Now, what about the music? According to *Audio Times*, an industry trade journal, 610 CD titles were released in 1983, the first year of the consumer CD, and 1038 were released in 1984. Although large yearly increases in the number of available titles are expected to continue, the total is far less than what is available on cassette or LP. If your taste in music goes to mainstream popular or mainstream classical, you're in luck. If you prefer more obscure music, be prepared to wait a while.

— A.R.

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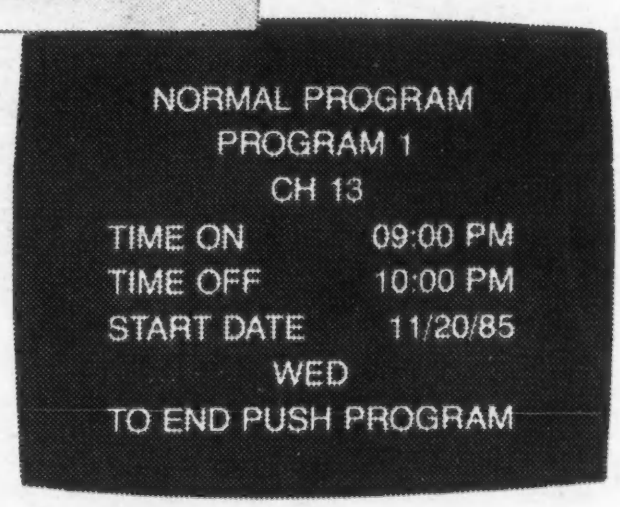

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Car

Continued from page 16

stretching and brittleness that plague tape. What the CD player is not immune to, though, is vibration and jarring. The laser head is subject to skipping, like an LP stylus and tone arm. If a CD is jarred and the head skips, the disc won't be damaged the way a record would be, but you'll hear the disruption.

To test the CD player, the owner of Cartunes in Watertown, Rich Inferrara, installed one in his car. He's been bouncing along the streets of Watertown for weeks and reports no ill effects on his CD player. Other auto-stereo installers report minimal problems, except when a driver has crashed into a pothole or slammed into a curb.

The small size (178mm by 50mm by 155mm for the Sony) of the in-car CD may be its best defense against annoying skips and bumps. Miniaturization has reduced the mass of the laser, allowing it to absorb shock without violent skipping. Manufacturers are also adding memory circuits so that, when the laser is jarred off track, it will return almost instantly to where it was. There are also cut-off circuits that kill the output so you don't hear noise when the player is jarred. "Intelligent" logic circuits can also reconstruct bits of data that have been skipped or obscured by scratches on the disc surface. Still, you probably won't want to install a CD player in the four-wheel-drive vehicle you use for careening down mountain trails in Vermont.

Before you trade your cassettes for CDs, you might want to consider another choice that is appearing on the horizon. Digital audio tape (DAT) offers a dynamic range similar to that of a CD, but allows for recording as well as playback. DAT is a byproduct of manufacturers' efforts to put stereo sound into video-cassette recorders, which use spinning heads and helical scanning. You can achieve digital audio-tape recording by using any VCR and a digital-to-analog converter, but putting such a system in the car is impractical. What are called DAT components today have simply been designed to handle the greater dynamic range of digital recordings.

Several manufacturers are interested in making an audio version of digital tape utilizing a standard Philips cassette housing (the tape itself will be somewhat different from today's audio tape), but there is no agreement on standards for the way the digital signal will be laid down on the tape. Until those standards emerge, there will be no widespread development of DAT, and though VCRs allow as much as eight hours of recording/playback, the amount of time DAT will ultimately provide is unknown.

For those who want to be able to play both cassettes and CDs, there will have to be some reconstruction of the dashboard. The CD player is designed to fit into the chassis where the cassette deck goes. Some in-car amplifiers, usually outboard models, allow for an additional auxiliary input that can accommodate the CD player, but you will have to create a place in or below the dashboard to fit the CD or the cassette deck.

Cassettes and CDs are not, of course, the only in-car music sources available. With the number of good radio stations broadcasting in the Boston area, some people may prefer to get their music from the public airwaves. Car-stereo receivers, too, have benefitted from advances in microelectronics.

Among car-stereo installers, the most controversial innovation is the diversity-reception antenna system. The system is designed to combat the problem of multipath distortion, which occurs when the FM signal is bounced around and obstructed on its way to your car. What happens is that your tuner picks up the reflected signals after it has received the direct signal, creating considerable distortion.

The diversity antenna system incorporates two antennas, ideally placed 31 inches apart but often placed much farther, front and rear. A microprocessor in the tuner monitors the signal from both antennas, constantly switching between them at a speed of 250 millionths of a second; this selects the best signal so all you get is clean, seamless reception. Sony is aggressively marketing a diversity-reception system with its XR-100 receiver.

There are two complaints about this type of system; first, that it doesn't deliver the quality signal as promised. Second, the two antennas require two holes to be punched in the car, increasing the likelihood of rust and potentially reducing the trade-in value of the car.

Another advance in car-stereo radio reception has been the increase in AM stereo broadcasts. More than 500 radio stations now broadcast in AM stereo, but only WBZ and the former WHUE make much of it in this area. Reportedly, AM stereo sounds very good, but a final standard among competing systems has not emerged, and the growth of AM stereo will be slow. Eventually it will be worth your while to include it in your car, but not immediately.

The digital quartz tuner, which has become a buzzword among auto-stereo salespeople, is a great improvement over the analog tuner, which relies on capacitors that are subject to drift. A quartz crystal provides a constant frequency, and a microprocessor compares the frequency of the station with the frequency of the quartz crystal, subtracting one from the other to get the difference. The microprocessor then monitors the system to make sure that the difference between the two frequencies doesn't vary.

There are other pieces of equipment designed to improve radio reception (particularly as you reach the fringe area of a station's coverage) that have been around for some time. These include tuners that automatically switch from stereo to mono when the signal begins to fade, or combine the upper frequencies of both channels but maintain stereo separation in the rest of the musical range when you reach the limits of good reception. Some receivers compensate automatically, by precisely turning up the volume during moments of increased highway noise, such as rolling down a window or sudden acceleration.

Auto-stereo amplifiers have experienced a steady increase in clean, undistorted power. Traditionally, auto-stereo systems have been pathetically underpowered, even though extra power is required to overcome the higher ambient noise level. More and more car systems are using two amps — one to power the woofers or subwoofers and another to drive the midrange speakers and tweeters.

It can be confusing to compare manufacturers' specifications on amplifiers because, unlike home systems, there are no standards for measurement. But amplifiers with 20 to 25 watts per channel or even exceeding 100 watts per channel are widely available. Twenty to 25 watts are usually sufficient to mask any normal road noise, including trucks, but 100-watt amps are available if you want to drag race with the top down.

For comparison of specifications, use the standard of X average watts per channel rms from 20 to 20,000Hz into 4 Ohms, with the lowest (expressed as a percentage) total harmonic distortion (THD). Formerly, it was not unusual for older amplifiers to produce less than 10 watts per channel with high levels of THD.

Speakers have also benefitted from improved materials and design. Ferro-fluid, a heat-dissipating and damping material that became popular in the late 1970s, has been joined by other exotic materials such as strontium-cobalt, titanium, polypropylene, and a variety of ferrite and aluminum alloys — brought to the audio industry by exiled aerospace engineers during that industry's last major recession.

The result of combining the more powerful amplifiers with the more sophisticated speakers is a better sound — and more of it — without blowing out the amplifier or the speakers, as happened regularly in the past.

The problem of getting deep bass has been solved with the use of subwoofers that are driven by a separate power source to keep the signal clean. Better crossover networks have improved speaker performance overall.

Graphic equalizers are popular, but auto-sound professionals give them a split verdict. Some complain that you can't play with the equalizer while driving. Instead, they suggest, put the money you'd spend on an equalizer into better components. But new equalizers, the enthusiasts counter, come with presets you can use to create and store settings for later use. Once you've set the levels for your favorite tape, you can save them and call

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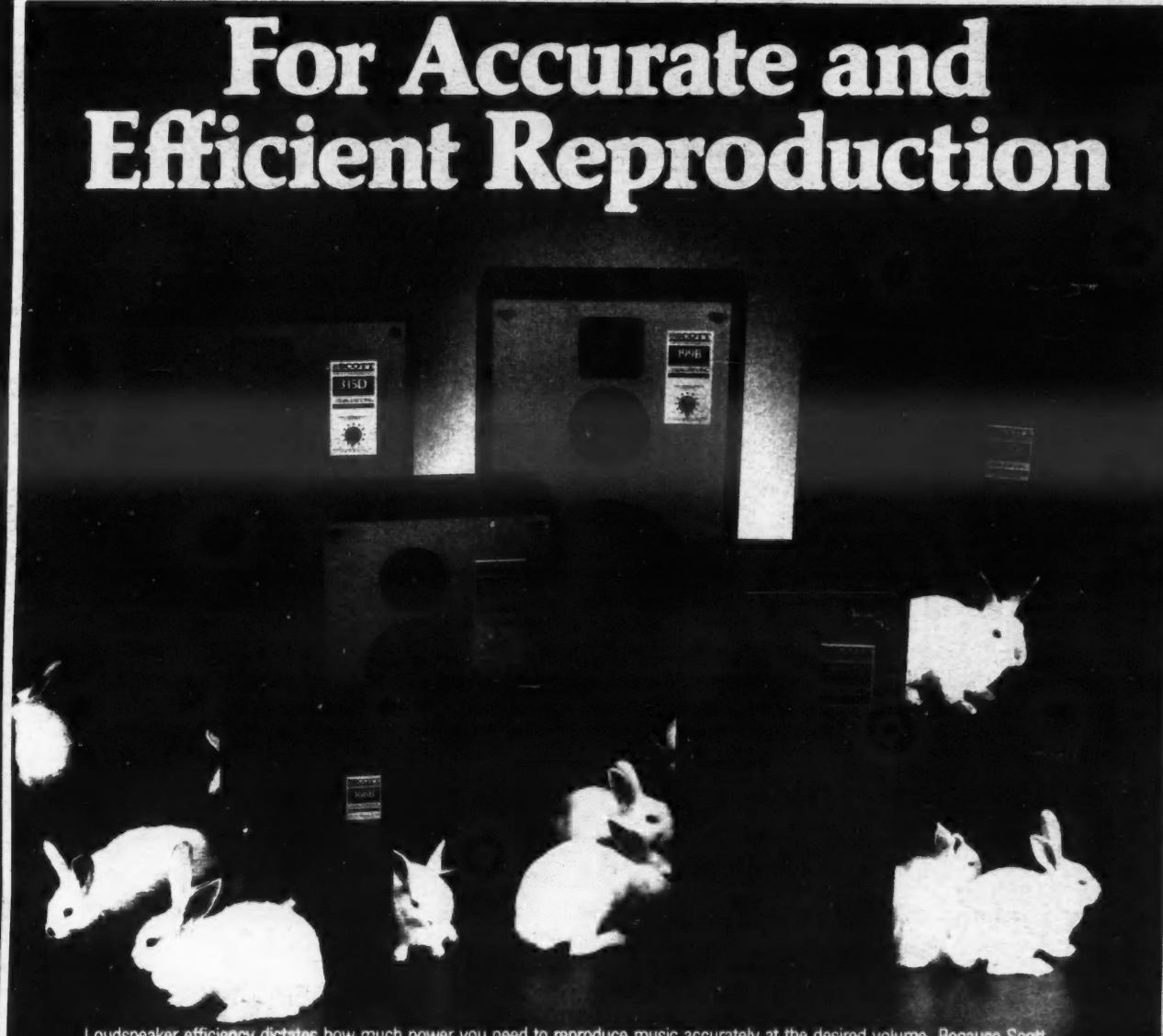

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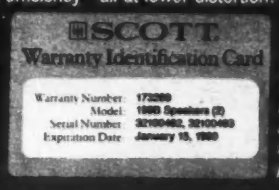

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up the setting whenever you play the tape.

• • •

If money isn't a concern, putting together an ideal state-of-the-art system from off-the-shelf products is a pleasant prospect.

Ideally, you'd have the right vehicle to put all this into. From an acoustic standpoint, the car should be small, tightly sealed, and quiet. The opinions of auto-stereo experts were divided over their favorites, but a BMW or a Saab are the most preferred.

Whatever your choice, let's use the Sony CDX-R7 ($700) for our CD player. More sophisticated models will appear soon, but Sony is the leader in CD consumer technology.

Our choice of tuner/cassette deck is the TD-1200 II by Nakamichi ($1260). It is an auto-reverse deck with wow and flutter of less than .045 percent and a dynamic range of 20 to 22,000Hz, plus or minus 3dB. The deck provides automatic azimuth control via Nakamichi's split-tape system, which splits the right channel at the head and uses a high-impedance sensing circuit to track both portions of the channel. If one portion leads the other, meaning the azimuth is off, the correction is made. Azimuth correction is critical in auto stereo because the tapes have not been made on the car deck. Given the added jarring and vibration of the car, and the alignment demands of the auto-reverse capability, azimuth correction is necessary if you don't want to risk losing the high end of your signal.

Our ideal system will use two amps, supplying clean power to six speakers (three pairs): tweeters and midrange up front, and subwoofers in the rear.

To drive the subwoofers, let's take the Hafler amplifier ($450) using MOSFET technology with 100 average watts per channel from 20 to 20,000Hz into 4 Ohms, with less than .0009 percent THD, although you could use a simpler mono amp. For the tweeters and midrange speakers, let's use the ADS P120, which uses 60 watts per channel into 4 Ohms with .1 percent distortion.

The tweeters and midrange speakers — B & W's Modular System II ($400) — will be mounted in the front and on the sides of the car. The ADS 7½-inch dual subwoofer ($259 per pair) with a frequency range of 30 to 150Hz plus or minus 3dB, can handle 120 watts rms and should give us a rich bass.

The ADS AX2 electronic crossover ($100) will be fine for our bi-amped system, and the Kenwood KGC-9400 seven-band equalizer ($299) rounds out our ideal auto stereo.

Audiophiles will always argue over the exact selection of favorite components, and for them Nakamichi holds a revered status. The above system has been selected, in part, to suggest quality alternatives to the Nakamichi favorites. There are many manufacturers of equally fine products, often at lower cost.

But whatever the price, even the best components in the store won't sound very good without excellent installation. Compared with a system in your home, where you have the luxury of space, an auto installation is tricky. Door panels become speaker cases, and cables and components must be kept clear of the many sources of interference in the cramped recesses of the car. If you are planning to invest top dollar in a fine car-stereo system, invest in a top installer, as well.

Finally, auto-stereo installers report that many of their sales and installations are replacement jobs for systems that have been stolen. If you're going to put in an expensive auto-stereo system, put in a good auto-alarm system at the same time. In Boston, you'll need it. □

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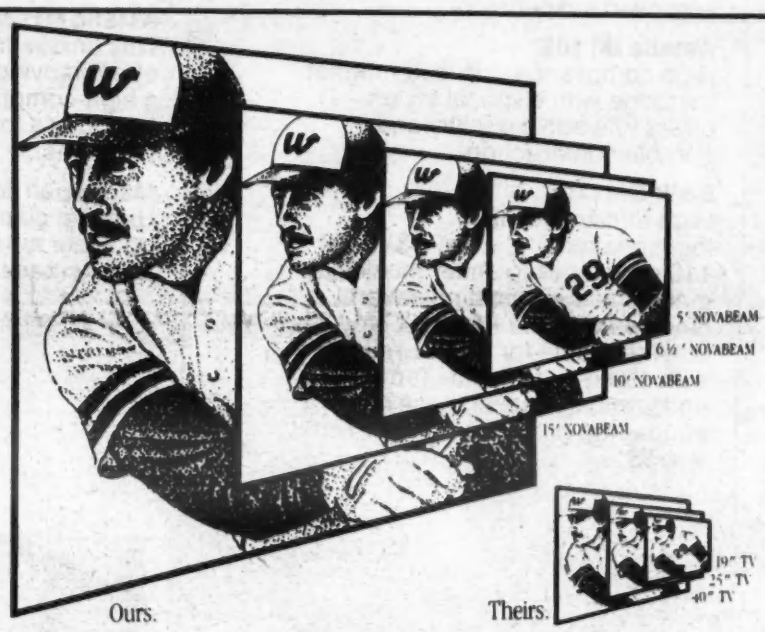

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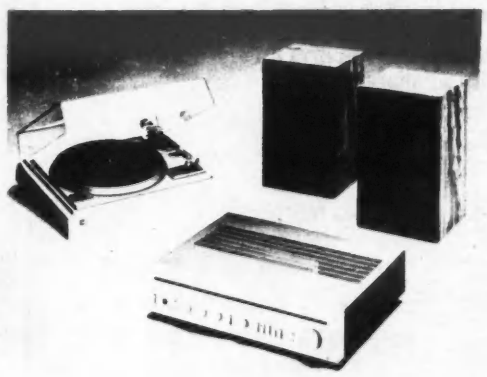

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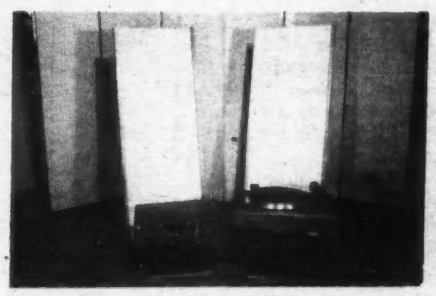

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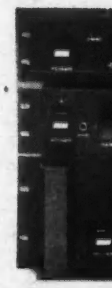

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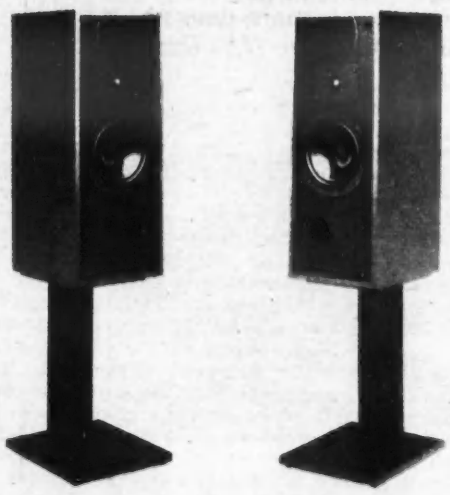

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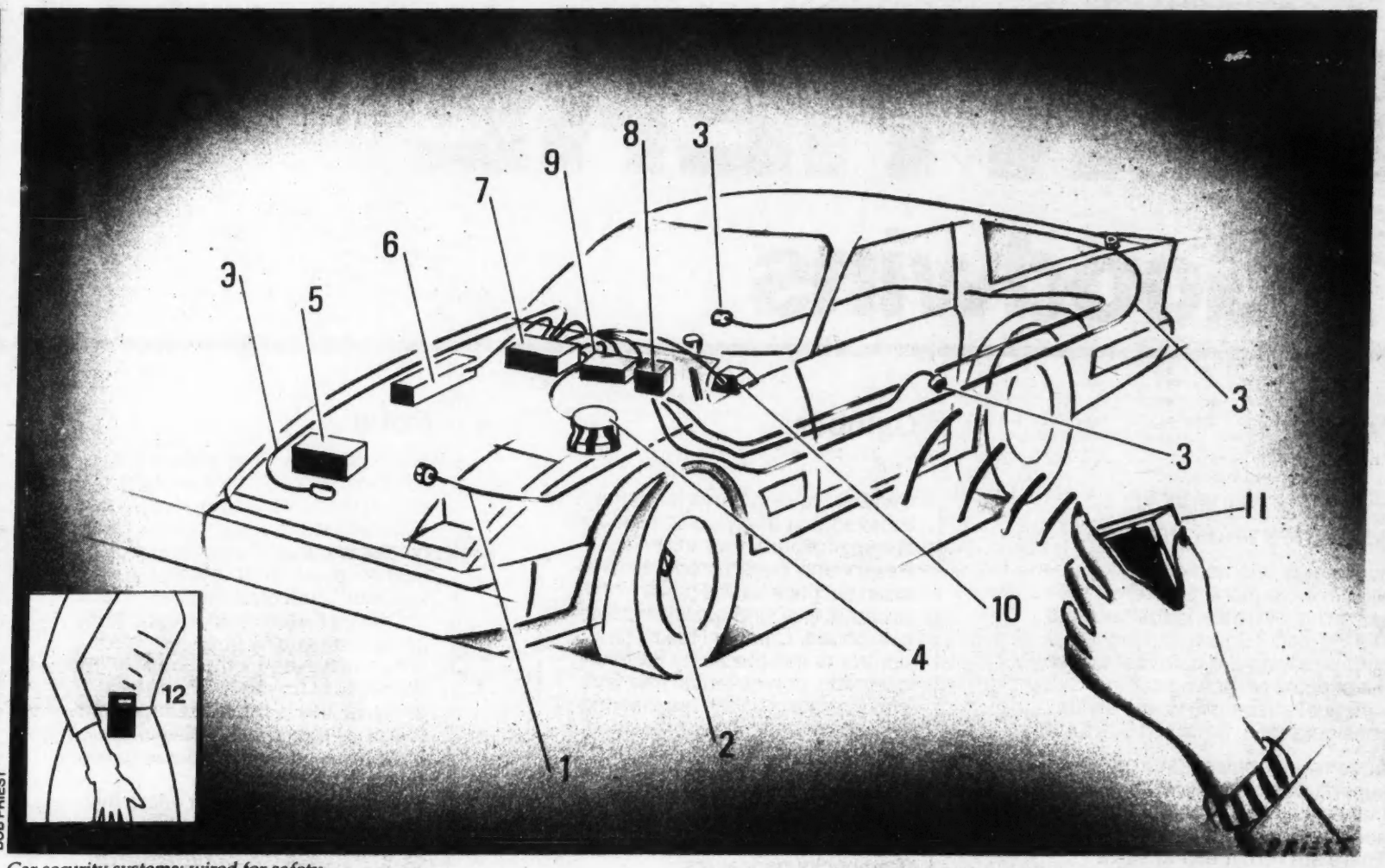

Car security systems: wired for safety

Defense mechanisms

The latest and safest car security systems to scare off the bad guys

by Brian Donovan

Boston is currently the number-one auto-theft center in the United States. It hasn't always been this way — the city used to be number two. The market for stolen spare parts and stereo equipment has made auto theft a $5-billion-a-year industry. A professional auto thief can make more in an evening than most of us make in two weeks. And the amateurs aren't doing too badly, either.

Joyriding, a popular activity of the '50s and '60s, was once the MO for most car thefts, and 90 percent of the cars stolen in the '60s were recovered. Less than 54 percent have been recovered in the 1980s. Today the car-theft business deals not so much in whole cars as in resellable parts — aluminum wheels, body parts, stereo equipment, and engine components — so a car stolen tonight in Boston can end up in the bins of a used-car-part dealer in Albany by the end of the week. Since it's impossible to trace the parts, this kind of a car theft is a low-risk, high-profit venture that removes another car from American streets every 28 seconds.

A recent census reveals that the average American household has three cars. More cars are being purchased in this country than ever before, and they're brimful of expensive hardware. Owners are equipping their cars with sophisticated mobile telephones, stereo equipment of a caliber you couldn't find in someone's home 10 years ago, and in some cases televisions and CB radios. The same public that once considered security systems a luxury now considers them mandatory investment protectors.

Over 130 different automobile security systems are currently on the market, from basic ignition-kill switches to microprocessor-based entry systems that can only be accessed by infrared signals. The microprocessor systems evolved quickly, out of necessity, as thieves learned how to defeat each generation of hardware-based units, making them worthless. One of the earliest, cheapest deterrents was the simple engine-kill, which allowed the owner to ground out the ignition system by flicking a hidden switch. But a thief could still get inside to remove the stereo, and if he wanted the whole car, he could even pop the hood and disconnect the kill-switch connecting wire.

Alarm systems mounted on the outside of the car's body, with sensors located in the hood, doors, and trunk, came next. The system was activated or disarmed with a lock-and-key device. If the car was opened without first deactivating the unit, the alarm would sound. Obsolescence arrived when thieves learned they could easily pick the locks or knock them out altogether with a hammer and screwdriver and then jump the connectors at the back of the lock barrel to disarm the system.

In the next generation of security systems, the arm/disarm function was controlled by the car's own ignition switch. Turning off the ignition would automatically activate the unit; re-inserting the key and turning the car on would disarm it. The ignition-control system had one big disadvantage: after opening the car door, the owner, of course, had to have time to get inside and disarm the system to prevent the alarm from sounding. Most units came equipped with a 10-second delay, which was fine for the owner but was also more than enough time for the thief to get inside, pop the hood, disconnect the battery, and kill the alarm's power supply. It then took less than a minute to remove the ignition cylinder by force, snip the wires to the siren, reconnect the battery, and start the car with a screwdriver. This system also relied on a key, and keys can be substituted for by master keys or duplicated.

Enter the chip. The application of microelectronics to automobile security systems finally made them hard to defeat. The auto thief needs more time than he can afford to disengage an electronic unit, which uses infrared sensors, microphones, motion detectors, sonic waves, voltage detectors, and electronic sensors to recognize a theft attempt. The threatened car responds by sounding an alarm, flashing its lights, disconnecting its ignition system, and paging its owner. (Electrocuting the thief is not a legal option at this stage of the game.)

Electronic security systems

Most of the available state-of-the-art systems include a siren or a noisemaker of some sort that is activated when the door, trunk, or hood is opened; a motion detector; and a brain box that arms and disarms the system, either by key, code, or transmitter. The popular Ungo Box (Techne Electronics, 916 Commercial Street, Palo Alto, California 94303) uses a keypad that looks like a small calculator. To disengage the alarm and start the car, the driver must first punch a four-digit code into the pad. Even if the thief has the car keys or removes the ignition cylinder, the Ungo Box will continue to prevent the car from starting until the code has been entered. The system's activation process begins when the ignition is turned off and is completed 30 seconds after the last door or trunk is closed. There is a 10 second delay between the time the door is opened, and the time the alarm sounds. Again, unfortunately, this is ample opportunity for a thief to pop the hood, kill the system by disconnecting the battery, and steal the stereo, if not the car.

1. Hood Lock
2. Wheel Locks
3. Opening Sensors
4. Siren
5. Backup Battery
6. Motion Detector
7. Brain Box
8. In-Car Keypad (inside car)
9. Pager Transmitter (inside car)
10. Glass Breakage Detector
11. Remote Disarm Transmitter
12. Pager Receiver

Techne offers an auxiliary power pack to supply power to the Ungo Box. Even if the battery fails or the wires are cut, the alarm will still sound and the ignition will remain disabled. This option is well worth the money. Indeed, most security-system manufacturers offer such a back-up battery pack, which adds an element of surprise for an unsuspecting thief.

The delays caused by ignition-controlled alarms can be avoided with any one of a number of remote disarm systems. Manufacturers of these systems include Alpine Electronics (19145 Gramercy Place, Torrance, California 90501), Chapman Industries (2638 United Lane, Elk Grove Village, Illinois 60007 Audiovox Security (150 Marcus Boulevard, Hauppauge, New York 11788), and Crime Stopper Security Products (9620 Topanga Canyon Place, Chatsworth, California 91311). The portable Crime Stopper unit uses an infrared beam to disarm the alarm system; the others rely on miniature radio transmitters.

Each of these firms offers various option packages, including motor-driven sirens, motion detectors, remote-control units, glass sensors, and ignition kills. They also offer special add-ons: panic buttons that allow the operator to sound the alarm from within the car, light flashers, power locks, hood openers, LED status indicators, and paging devices. Alpine Electronics even offers a remote control that enables a driver to beep the horn, flash the lights, and activate the siren while he's away from the car, once his pager has indicated that the car is being threatened. (This option not only frightens off potential thieves, but helps the driver locate the car in crowded parking lots.)

Hood-lock ignition-kill units

Both Chapman and Z-Lok (Ultra-Tech, 4 Keith Way, Hingham, Massachusetts 02043) offer mechanical ignition-kill units that can be installed with other manufacturers' sophisticated electronic systems. Each features a manually activated cable that runs from beneath the dash to the hood-lock mechanism. A stainless-steel bolt acts as a deadlock, even if the thief has popped the hood release inside the car. The dashboard end of the mechanism contains a stainless-steel key lock, similar to the one on a soda machine, which cannot be picked easily. The cable is protected by a steel tube that is tough to cut, even with bolt cutters. The driver needs only to push in the lock to secure the hood and disengage the ignition.

Motion detectors

Many firms offer motion detectors. Before you buy one, be forewarned: they are the number-one cause of false alarms. Many types of motion detectors are available and, not surprisingly, their reliability is commensurate with price. A little extra money now may save you a trip outside some January night at 3 a.m., when a late-returning

neighbor accidentally brushes against your car. The simplest motion detector is nothing more than a small weight at the end of a spring. When the car moves in any way, the weight slides up and down, completing a circuit and setting off the alarm. The spring can be adjusted, but most people set it for maximum sensitivity, which means that anything from a vibration of the parking-garage floor to a strong wind can set it off. (This is why there are rules against leaving alarm systems on in most Boston parking garages.)

Some electronic motion detectors can even monitor particular frequencies associated with car theft. Variations on these detectors include ultrasonic sensors that register any disturbance in a given field and microphones that "hear" the thief breaking in. Sophisticated microprocessors, which receive messages from the sensors, are actually programmed to differentiate between a child leaning on the car, a truck rumbling by, or an actual theft attempt.

Glass sensors

Glass sensors are a fairly new development, but most manufacturers, including Chapman, Z-Lok, Crime Stopper, Alpine, and Audiovox, have incorporated them into their product lines. The glass sensor contains a piezoelectric component tuned to trigger the alarm if something solid hits the glass or, of course, if the glass is broken. It's an inexpensive add-on to any system, at approximately $50. (You may want to pass on this option if the kids in your neighborhood play a lot of Frisbee.)

Pagers

If you opt for a manufacturer's total security package, you'll get a pager that will beep you the instant the car's security system detects a theft attempt. An on-board transmitter uses the car's antenna, or its own, to alert the owner. Some thieves will quickly remove the antenna if they suspect a pager is in use. It is more likely, however, that a thief won't care, since he plans to be gone long before you can get to your car. Essentially all a pager can do is let you know your car has been stolen. Both the police and pager manufacturers caution against trying to intercept the thief, if you do manage to get to the scene of the crime before the getaway.

* * *

So, is it even possible to defeat a car thief? "It depends on how badly the thief wants the car," replies Dana Lariviere, manager of Audio Acoustics, in Nashua, New Hampshire, which installs custom security and entertainment systems. "There are all sorts of stories of cars with their sirens howling and their lights flashing being winched up onto ramp trucks. The police have actually caught some of the truck drivers, who, in turn, produce a phony authorization and work order. Many theft rings work out of legitimate or legitimate-appearing body shops. Your basic effort in installing a system is to delay the thief. The longer it takes him to defeat your system, the less likely it is that he will stay with your car, especially if there's an unprotected car on the other side of the street."

The integrity of any system can be compromised by poor installation. It generally pays to have your system installed by an established dealer. Unless you are an experienced technician or auto expert, the money you save by installing it yourself isn't worth the difficulty or the loss of warranty if you do it wrong.

One last note: if you buy a system, don't advertise it on the window with a sticker that announces the type of protection you have. One naïve school of thought holds that thieves who see the sticker will move on to an unprotected car. Most experts, however, feel you are handing the keys of the chicken coop to the fox by removing the element of surprise and giving the thief the information he needs to outfox the security system. □

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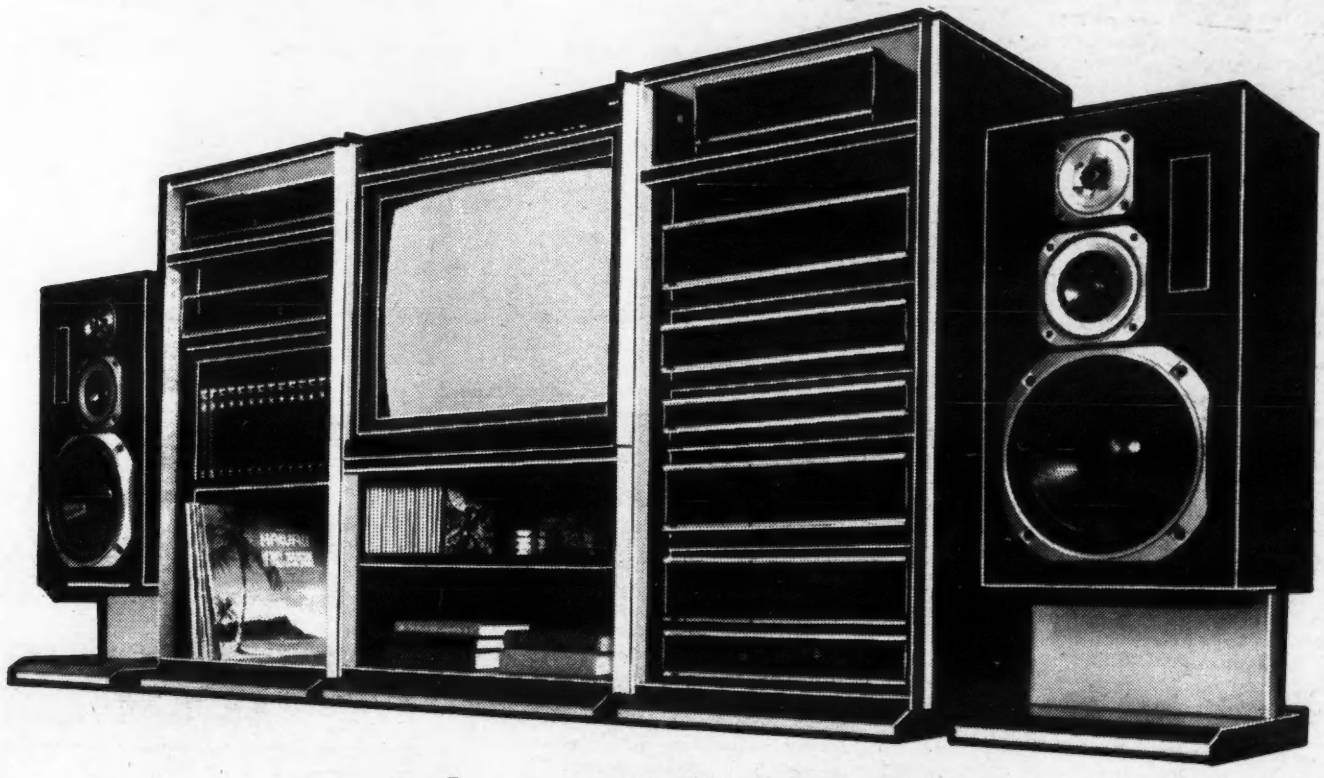

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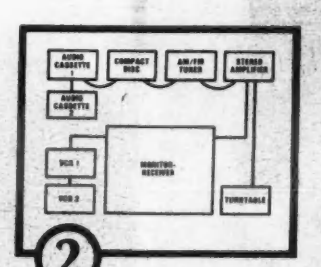
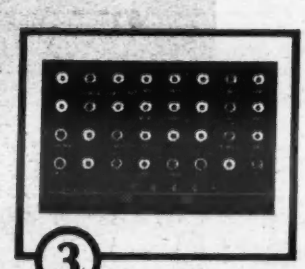
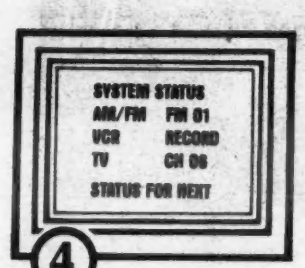


SystemLink is Dimensia's unique interconnect system. Allows you to connect most components in "daisy chain" fashion as shown above instead of running all connections to amplifier.



Rear Jack Panel on Monitor features input/output jacks which link all compatible devices. You can access several audio/video devices remotely, and Monitor's "intelligence" will do the rest.



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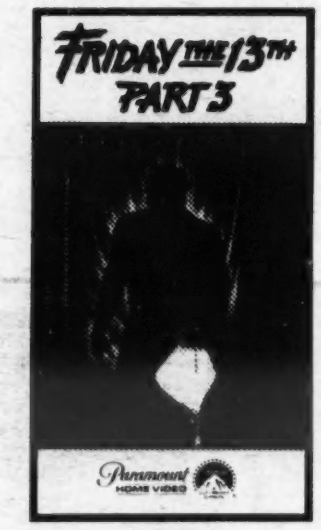

PART 3

PART 2

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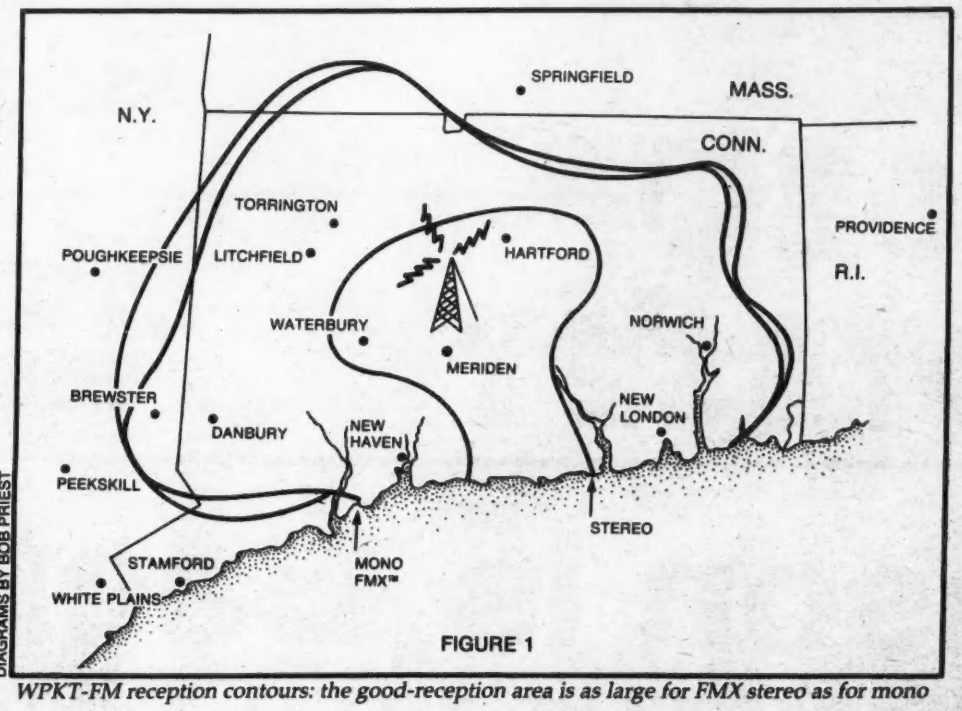


DIAGRAMS BY BOB PRIEST

FIGURE 1

WPKT-FM reception contours: the good-reception area is as large for FMX stereo as for mono

Stereo tonic

FM broadcasting extends its range

by Peter W. Mitchell

In electronic engineering, an information-carrying medium is described as "robust" if it consistently delivers a strong, clear signal uncontaminated by noise or interference. The digital compact disc, for example, is robust. Unlike analogue discs and tapes, the CD doesn't suffer from ticks or pops, hiss or hum, inner-groove distortion, crosstalk, dropouts, the dull treble of Dolby mistracking, or the wear that comes from repeated playing.

As originally designed, FM radio was also robust. Unlike AM radio, which picks up static from refrigerators, hair dryers, cars, fluorescent lights, computers, and distant thunderstorms, as well as getting a great deal of interference from distant stations on adjacent channels or on the same frequency, FM is relatively problem-free. The selectivity and "capture" effects of FM virtually eliminate interference from other stations, and above a fairly modest signal strength all FM signals deliver a consistently high signal-to-noise ratio — but only in mono.

The addition of stereo, nearly a quarter of a century ago, made FM substantially less robust. The wider bandwidth needed for stereo conflicts with the sharply limited bandwidth desired for good selectivity, so stereo makes it more difficult to pick up weak signals adjacent to strong stations on the dial. The multiplex subcarrier that contains the stereo information is an AM signal, which makes stereo FM vulnerable to static from automobile engines, computers, and nearby CD players, and to multipath interference. (Multipath is the delayed arrival of reflected signals from the same station. The reflected signals interfere with the direct signal. Whereas an FM detector tends to "capture" one signal and lock onto it, an AM detector will demodulate both signals together, producing distortion.)

The most obvious problem with stereo FM is that it degrades the tuner's sensitivity by 23dB, meaning that received signals have to be about 14 times stronger in stereo than in mono. Thus, while you may get good mono FM reception of stations up to 70 miles away with a typically modest antenna, in stereo you're likely to be limited to stations within a radius of 30 miles (an area less than one fourth as large). The adoption of stereo affects the listener in restricting the number of stations that can be received with acceptable sound quality. The adoption of stereo affects the broadcaster in drastically reducing the effective coverage area of the transmission — and hence the size of the potential listening audience.

The inevitable result is that most FM transmitters are located near major cities so as to be within 30 miles of the largest possible population. If listeners in outer suburbs and rural areas want to hear these urban stations, they must use monophonic reception to minimize noise. (At signal strengths below about 300 microvolts, reception is 20dB quieter in mono than in stereo.)

To bring a large audience FM stereo that has an acceptable signal-to-noise ratio, most broadcasters feel compelled to compress the dynamic range of the sound, keeping the audio modulation high above the noise. This doesn't much matter with pop music, which is usually recorded at a constantly loud volume level anyway, but it alters the character of any music that depends on dynamic contrasts between soft and loud. Worse yet, the limiters used in FM roll off the high frequencies in the loudest portions of the music to avoid illegal overmodulation (such overmodulation would splatter the station's signal into an adjacent station's channel, causing interference). This high-level rolloff kills the brilliance of bells, cymbals, and other percussive sounds.

The compression and dulling of FM sound is becoming more obvious, as a larger percentage of listeners accustom their ears to the brilliant, wide-range sound of compact discs. FM radio needs a technological advance that will permit it to provide wide-range sound to listeners over a large area.

Enter FMX, the new "extended-range" FM stereo system developed by the CBS Technology Center in Stamford, Connecticut. The FMX process involves a new way of transmitting the stereo signal. It requires new tuner circuits to decode the signal at home, but the result is dramatic: it completely abolishes the 23dB noise penalty of stereo FM. The coverage area of the transmitter is as large with FMX stereo as it is with ordinary mono, and the signal-to-noise ratio of a distant FM station is as good with FMX stereo as it is in mono.

Figure 1 shows reception contours for radio station WPKT-FM in Meriden, Connecticut, where CBS has been conducting on-air tests of FMX extended-range stereo. The innermost curve illustrates the reception area for ordinary FM stereo. The overlapping outer curves outline the measured areas of good reception — nearly identical — for mono and for FMX stereo. FMX doubles the range of normal FM stereo and quadruples the area over which good reception is obtained.

The first tuners with FMX-decoding circuitry will be on the market next spring. By then at least a handful of stations in the US will be broadcasting in FMX stereo, though it will probably take several years for FMX broadcasting to become commonplace. (Recall, by way of comparison, that stereo FM began in 1962 but didn't become the norm until about 1970.) It's too early to tell just how commonplace FMX broadcasting will become, but it is likely to prove popular among broadcasters because it is a relatively inexpensive way for a station to expand its effective coverage area.

How does FMX work its wonders? Basically, the problem is similar to that of analogue recorders, video discs, movie soundtracks, VCRs, and TV: wide-range sounds must be compressed to fit within a limited-range medium, but the compression must be done in such a way that it can be undone at the receiving end. This is the basis of Dolby and dbx noise reduction, the CX noise reduction in video discs, Dolby Stereo movies, the Beta Hi-Fi and VHS Hi-Fi VCR systems, and stereo TV.

But these processes can't easily be applied to FM, because of the problem of compatibility. Whatever is done to the sound at the transmitter must be compatible with the hundred million FM radios that are already in use. FM broadcasting is a lucrative business, and no one wants to risk upsetting the apple cart by altering the broadcast sound in a way that might offend listeners. Dolby FM was introduced a decade ago, but relatively few stations adopted it, because it produced a slight but noticeable change in tone quality.

The clever thing about FMX is that it doesn't alter the present stereo signal, so it is completely compatible with existing FM receivers. To understand what FMX does, let's review the multiplex process by which two channels of sound are combined onto one FM signal. The left and right channels are added together and transmitted as an L + R mono signal. At the same time the stereo "difference" signal (L − R) is broadcast on an ultrasonic subcarrier at 38kHz. This L − R signal contains all of the spatial and localization cues that our ears use to perceive the stereo image. But it is this L − R subcarrier that becomes very noisy when the FM signal received by the tuner is weaker than 100 microvolts — that is, at distances greater than a few miles from the transmitter.

In an FMX broadcast, a second 38kHz subcarrier is added to the signal in "quadrature," meaning that it is phase-shifted 90 degrees from the standard subcarrier. The second subcarrier contains the same L − R difference signal as the standard subcarrier, but in a highly compressed form that keeps it far above the noise. To receive FMX stereo you'll need a second stereo decoder to detect the quadrature signal, demodulate the compressed L − R information, and re-expand it to restore the original dynamic range. A pilot tone in the signal will cause the tuner to switch automatically to the second decoder when you tune to an FMX-encoded broadcast.

If you have one of the many tuners made in the late '70s that were equipped with a "detector" output for use with an anticipated quadraphonic (four-channel) decoder, you may be able to connect an external FMX decoder to that output. Otherwise, if you want to decode FMX broadcasts, you'll need to buy a new tuner equipped for that purpose when they appear in stores next spring.

The second clever thing about FMX is the design of its compression/expansion noise-reduction system, which appears to be totally free of the side effects that most NR circuits impose on the sound. At a CBS demonstration I listened at length to a variety of recordings played through a dummy transmitter and received via an FMX-equipped tuner. I failed to detect any of the faults that can be heard in other NR systems: noise pumping, changes in imaging or timbre, and so forth. FMX is remarkably accurate, and even with very weak signals it delivers transparent, spacious, noise-free stereo sound.

The FMX system has a crucial advantage over conventional noise-reduction circuits: it is virtually immune to compander mistracking. The circuit always knows to what dynamic level the compressed L − R signal should be re-expanded, because it has the standard L − R signal for comparison. Ordinary companders must work blind, deriving their control voltages directly from the compressed signal itself; any flaw that alters the audio signal may also cause errors in the dynamic expansion. This is why Dolby NR alters timbre and dbx exaggerates tape dropouts.

The complexity of the FMX circuit may add $100 or more to the cost of the first FM tuners made with it. But next year the FMX circuit will be available to manufacturers in a pair of integrated-circuit chips that can be included in tuners at very low cost. Eventually FMX decoders may appear in the receivers that need it most: portable and automobile stereos, where signals are always weak because of the impracticality of carrying around a high-gain FM antenna. □

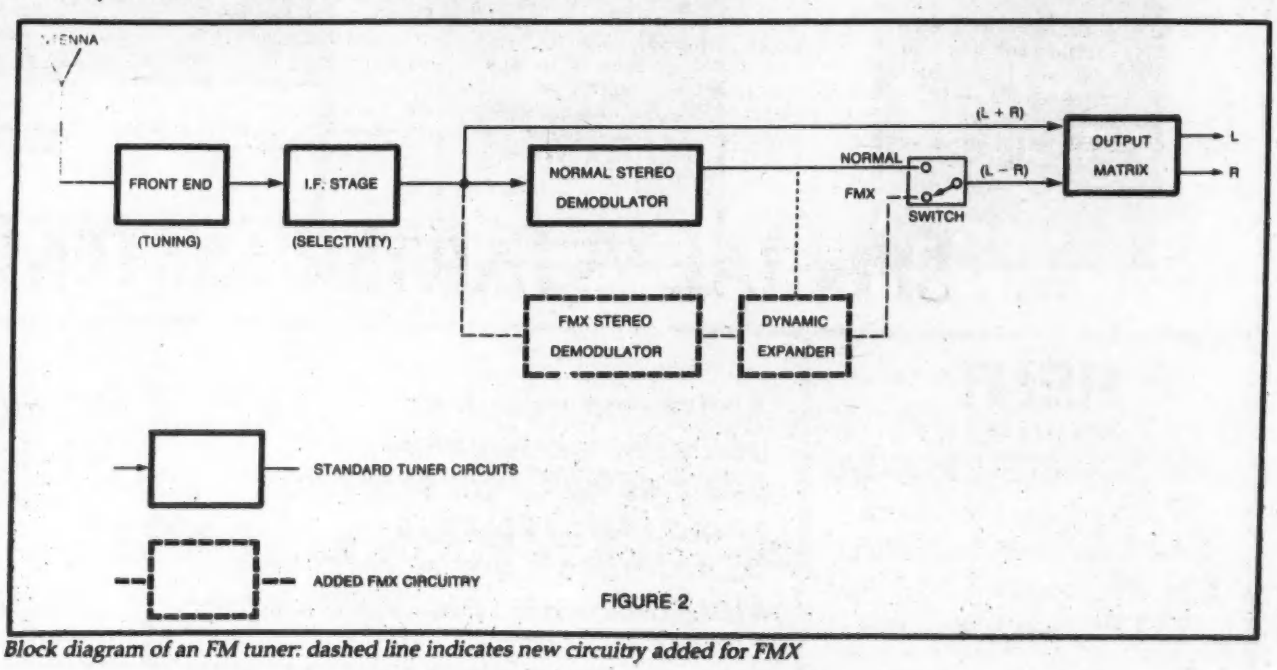
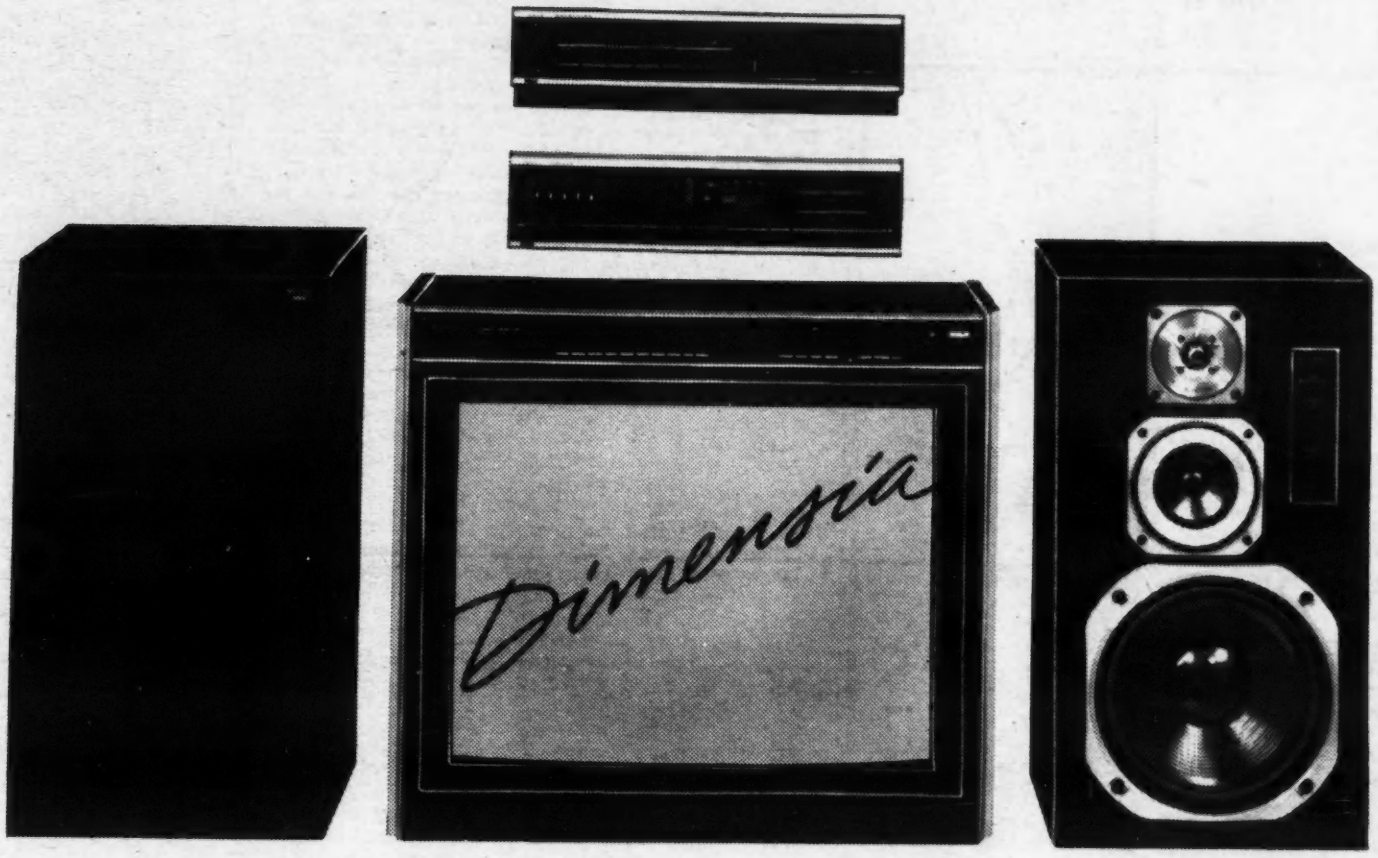


FIGURE 2

Block diagram of an FM tuner: dashed line indicates new circuitry added for FMX



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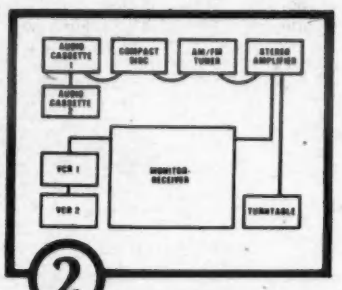

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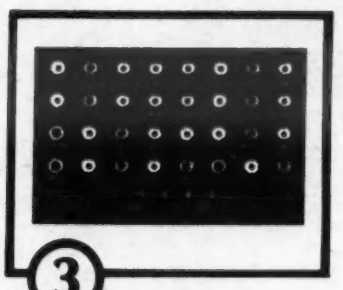

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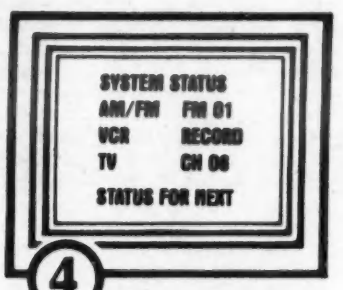

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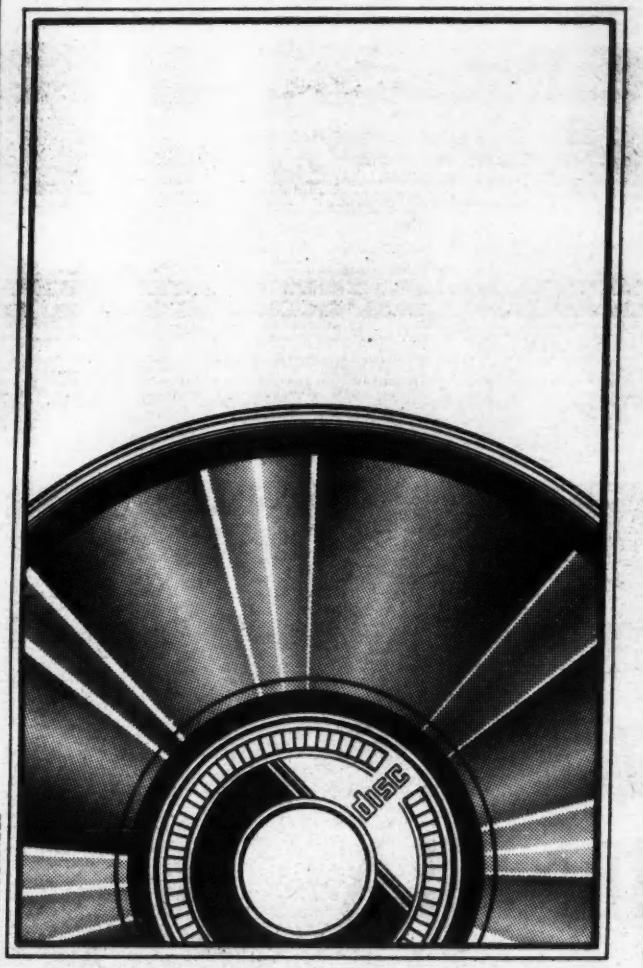

FRANK O'CONNELL

POPULAR

25 #1 Hits from 25 Years: Various artists. Motown MCD06132MD-2. Two discs. Playing times: 44 minutes; 46 minutes.

As part of the label's 25th-anniversary celebration in 1983, Motown put together what could only be called a dream compilation: 25 of its greatest songs on a two-LP set. And, contrary to Motown's standard practices, *25 #1 Hits* was all classics, with no filler. You might get picky about some of the omissions ("Stop in the Name of Love," "Never Can Say Goodbye"), but there was no arguing with the choice of songs that *did* make up the exalted 25. Why bother with *The Big Chill* soundtrack? Side one alone of *25 #1 Hits* boasts "Please Mr. Postman," "Baby Love," "My Girl," "I Can't Help Myself," "You Can't Hurry Love," "Reach Out I'll Be There," "I Heard It Through the Grapevine," and "I Want You Back."

As flat-out wonderful as the LP set was, the compact-disc version is even better. At Motown, the emphasis was squarely on the vocals, which were usually mixed way up front and tended to override most of the playing. I don't believe that there was any remixing when *25 #1 Hits* was mastered, but the CD's clarity allows you to hear the players as distinctly as the singers. On "Tears of a Clown," for example, the drums have much more definition and, by comparison, sound muffled on the LP version, even though that's the way we've always heard them. Best of all, you get this extra punch from the instruments without sacrificing one iota of Smokey's voice.

A single detail indicates the loving care that Motown and the set's compiler, John Matousek, have put into this project: volume one of the CD set combines the LP's sides one and three, while volume two consists of sides two and four. This way, they've kept the chronological continuity, putting "A B C" right after "I Want You Back," which is a must.

— **M. Howell**

Motown Grammy Rhythm & Blues Performances of the 1960s and 1970s: Various artists. Motown MCD06110MD. Playing time: 56 minutes, 25 seconds.

This disc, whose 16 songs are arranged in chronological order, provides a history of Motown recording techniques. Most of the vocals have the label's characteristic presence peak, though for once the effect seems less severe on the CD than on previously released LPs and 45s, for which thanks may be due to CD producer John Matousek. But you always have to turn up the bass to get a Motown recording to sound right.

Don't be dismayed by the cavernous and shrill fake stereo of the first cut, Martha and the Vandellas' "Love Is like a Heatwave." The sound gets better as you go along. The stereo mixes from the '60s are pretty rudimentary, with vocal solos dead center, vocal back-up groups crammed into the right speaker, and drums and strings on the left.

Artistically, the disc peaks with the Temptations' 1972 recording of "Papa Was a Rollin' Stone," an almost symphonic effort with an instrumental intro nearly two minutes long. After that the recordings get more obscure — how many of you remember when Diana Ross's "Love Hangover" hit the charts? The inclusion of a song by Thelma Houston ("Don't Leave Me This Way") allows us to hear, by comparison with Sheffield's vastly better *Thelma Houston and Pressure Cooker* album, just how much of the special quality of some of these voices has been lost to Motown's relentlessly airplay-oriented engineering.

The earlier selections are mostly good ones, including "Baby Love," recorded back when Diana Ross was a Supreme; Marvin Gaye and Tammi Terrell's "Ain't No Mountain High Enough"; "I Second That Emotion" by Smokey Robinson and the Miracles; and Steve Wonder with "For Once in My Life" and "Signed, Sealed & Delivered."

— **E. Brad Meyer**

Around the World in a Day: Prince and the Revolution. Warner Bros./Paisley Park 25286-2. Playing time: 42 minutes, 30 seconds.

There's little sense in comparing the sound quality on the LP and the CD of Prince's newest. *Around the World in a Day* was recorded fairly cleanly on what I assume to be state-of-the-art analog equipment. The CD was mastered from that analog tape and, aside from the lack of surface noise, there aren't any startling differences between the two versions.

What is surprising is the way that the disc is packaged. Various manufacturers have been experimenting with alternatives to the hard-plastic "jewel box." Knowing that Prince is the hottest thing going right now, Warner Bros. decided to use one of these alternative packages for his newest release. It stinks.

The outside packaging is heavy cardboard, measuring an ungainly 5¾ inches by 12½ inches — about the same size as that of a conventional jewel box. Unfortunately, you can't throw this thing away; it opens into a triptych that contains the lyrics and looks something like a miniature LP. What we have here is a CD recast as an LP: cardboard jacket and soft-paper inner sleeve. Instead of the little information booklets that slip into the front of the jewel box, you have a bulky cardboard storage problem. And instead of the neat, compact plastic case, you have two artifacts. It's even more of a mess than the song about talking to God.

— **M.H.**

Beggar's Banquet: The Rolling Stones. London 800084-2. Playing time: 40 minutes.

Now that CDs are becoming so popular, it's a bit astonishing that there has been no rush to release CD versions of two of the biggest groups in rock history, the Beatles and the Stones. Rumor has it that the Beatles' catalogue is tied up in one of the band's never-ending lawsuits (although you wouldn't think that would deter EMI). Import CDs of the Stones' early LPs have begun to appear in the better-stocked stores. To be truthful, the Stones' production during that period must rank among the most sloppy ever — Andrew Loog Oldham's idea of a mix was to turn everything up. Nevertheless, though I'd hesitate before buying a CD of *Aftermath* or *12 x 5*, the little "digitally remastered" flag on *Beggar's Banquet* swayed me.

I'm glad it did. Though "Sympathy for the Devil" and "Street Fighting Man" became the album's best-known songs, quite a lot of *Beggar's Banquet* is acoustic-blues-based. The remastering brings the acoustic guitars to life, particularly when there are two weaving around each other, as on "Prodigal Son." Earthy ("Stray Cat Blues"), funny ("Factory Girl"), and occasionally spooky ("Jigsaw Puzzle"), it may be the Stones' most human album, as well as Brian Jones's last.

— **M.H.**

Stop Making Sense: Talking Heads. Sire 9 25186-2. Playing time: 46 minutes, 32 seconds.

This is the soundtrack album from the best rock concert movie I've ever seen. The sound in the theater was too loud and slightly hard in the presence range, but it didn't have the shrillness of much of the group's earlier CD material. I'm happy to report that most of the unpleasantness was the fault of the theater speakers; the disc sounds great, better than most of the group's studio efforts and phenomenally good for a live concert.

We remember visual images in conjunction with sound. Advertisers know that once we've seen a TV commercial, they can play us the soundtrack on the radio and we'll mentally supply the pictures. So maybe I'm prejudiced by the memory of David Byrne doing his leaning-back dance, but the performances on this disc are dynamite. This supposedly arty rock band plays and sings its collective ass off.

If that's not enough, you get a 20-page booklet filled with stills from the movie — many in full color. The captions contain some of the band's helpful hints for coping with life, organized by category. For example, under Tips for Performers: "Singing is a trick to get people to listen to music for longer than they would ordinarily. There is no music in space. People will pay to watch other people make sounds." Living with Other People: "Civilized people walk funny. There is a party going on somewhere. People will remember you better if you always wear the same outfit." Life on Earth: "Nuclear weapons can wipe out life on Earth, if used properly. Cats like houses better than people. Dolphins find people amusing, but they don't want to talk to them." In the Home: "There have been cases where people's shoes got stuck on their feet and could never be removed. The best way to get rid of flying insects is to have strong body odor. There hasn't been a good-looking American car in 20 years."

My only complaint is that the disc isn't long enough. Sire Records has already short-changed CD buyers once by giving us the LP version of *Speaking in Tongues* rather than the longer one released on cassette. Surely there was more than 46 minutes of usable stuff in a concert where the band played this well.

— **E.B.M.**

The Bee Gees 1st: The Bee Gees. RSO 825 220-2. Playing time: 37 minutes, 52 seconds.

Some of us are old enough to remember that the Bee Gees were an interesting group before they turned into the multiple-platinum disco conglomerate that everyone loves to hate. This album, made in England when Barry Gibb was 17 and Maurice and Robin only 15, was the first to achieve notice outside of Australia. (They had a weekly TV show in Brisbane when the Gibb brothers were 10 and 8.)

When this record came out the music seemed like normal Top 40 stuff; now it's painfully obvious how imitative it was of a slightly more famous British group. The

TIMOTHY CARLSON

The Temptations: a symphonic rock-out

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cover art looks like a mixture of *Rubber Soul* and *Revolver*; "Red Chair Fade Away" sounds like "I Am the Walrus"; "In My Own Time" sounds like "Taxman"; "Craise Finton Kirk . . ." is a combination of "Nowhere Man" and "Your Mother Should Know"; and the orchestral backing all sounds like George Martin.

Through the heavy Beatles influence, though, there occasionally shines an originality that will surprise you if you think of these guys only as plastic disco dolls. "New York Mining Disaster 1941" is an impressionistic two-minute movie/song; its contained desperation is reminiscent of Randy Newman's musical sketches. "Every Christian Lion-Hearted Man Will Show You" is effective without being like anything else I can think of.

The main strength of the group lies in their singing, which — in the days before the Gibb tremolo and nasality evolved into parodies of themselves — was of a far higher caliber than that of most popular groups of any stripe. Close harmonies that would be the envy of many a bluegrass quartet are central to songs like "Turn of the Century" and "In My Own Time," even if the latter does contain the most feeble and inane psychedelic guitar solo ever recorded.

The digital transfer was made at too high a level, but once you turn the volume control down a bit the mellow sound of this old tape is a welcome relief from the harsh pop vocal and percussion tracks that the group (like almost everyone else) records nowadays. The stereo image consists of three knots of sound at the left, center, and right, but the vocal and instrumental forces are nicely distributed among them.

— E.B.M.

California Project: Papa Doo Run Run. Telarc CD-70501. Playing time: 42 minutes, 32 seconds.

The Telarc booth is a regular stopping point at consumer-electronics shows for audio journalists, who survey the latest releases, try to cadge review copies (with which Telarc is notoriously stingy), and listen to the latest of the label's minimally miked classical recordings. A couple of shows back they surprised everyone with a Beach Boys song, "Good Vibrations," that had been imbued, miraculously, with huge dynamic range and clean bass and been utterly purged of tape hiss.

But after a while you could hear that it wasn't really the Beach Boys, just a bunch of musicians carefully re-creating their arrangements. *California Project* is the first complete disc by that group, whose name is Papa Doo Run Run. They do 15 songs, including "I Get Around," "Wouldn't It Be Nice," "Don't Worry Baby," "Surfer Girl," and "Fun, Fun, Fun."

The sound is immaculate, with deep bass and vocal timbres that are bright (to reproduce the Beach Boys' throaty sound) but not harsh. For the first time, I can understand the words to the second verse of "Fun, Fun, Fun" ("All the girls can't stand her 'cause she walks, looks, and drives like an ace, now"). But despite the peripheral involvement of Mike Love and Dean Torrence (of the Beach Boys and Jan and Dean, respectively), the whole thing has, as you might guess, more a feeling of loving recreation than of real music making. Somehow there's no juice in it.

Oh well, it's still fun, and if you remember the originals you'll like hearing them tricked out this way.

— E.B.M.

CLASSICAL

Rodrigo: *Concierto de Aranjuez; Tres piezas españolas; Invocation et danse.* Julian Bream, guitar; the Chamber Orchestra of Europe, John Eliot Gardiner conducting. RCA RCD 14900. Playing time: 45 minutes, 18 seconds.

The popular Rodrigo concerto, whose second movement has provided material for jazz pieces by Miles Davis, guitarist Jimmy Hall, and many others, is very hard to record in its original form. The main problem is that of balancing a soft nylon- or gut-stringed guitar with the overlarge orchestras that have generally been used.

The usual solution has been to give the guitar its own closely placed microphone and to do the same with the individual sections of the orchestra. As a result, even recordings that have reasonably good instrumental timbres have lacked a realistic spatial perspective.

I'm not familiar with the Chamber Orchestra of Europe, but the group as constituted here is the perfect size for the concerto, and this recording conveys a generous sense of a very reverberant acoustic space, as well as precise localization of the instruments in a wide and deep sound stage. The performance is well modulated, fluid, and more delicate than some of Bream's older recordings.

The sound unfortunately illustrates the British tendency to get the imaging right at the expense of instrumental timbre. The concerto betrays a slight midrange hardness in loud passages, as might be expected from the large-diaphragm Neumann microphones used. The other pieces, solo works recorded in a different location with a Neumann SM-69 stereo mike, are somewhat worse in this regard. The hall (Wardour Chapel, Dorset) is too reverberant, and it is the room's sound that the microphone renders least well.

The producers faded down the room sound (together with the excessive noise from the microphone preamplifiers) between every band, even between movements of the concerto. The interruptions are distracting, and in the absence of the pre-amp noise you can hear the unpleasant rasp of the improperly dithered Mitsubishi digital processor used for the original recording. In this case the pre-amp noise is a blessing in disguise, as it keeps the processor from misbehaving during the music. It would have been easy to record extra room sound at the sessions and use it as connective tissue between works or sections, but at the time these works were recorded (late 1982 and early 1983) the benefits of that practice were less well understood than they are now.

Despite these problems and the limited length of the program, I recommend this disc for the concerto. Besides being a fine performance, it is the first recording to achieve proper sonic proportions and present them faithfully to the listener.

— E.B.M.

Time Warp (music from *2001, Star Trek, Battlestar Galactica, Star Wars*): the Cincinnati Pops, Erick Kunzel conducting. Telarc CD-80106. Playing time: 51 minutes.

According to an unshakable Hollywood rule, sequels are never as good as the movies they are derived from. Evidently that law applies to recordings of movie music as well. Last summer's top-selling CD (deservedly) was Telarc's *Star Tracks*, a superbly played and magnificently recorded collection of John Williams's music for the *Star Wars* trilogy, *E.T.*, and *Close Encounters*. This summer Telarc tried to build on its success with *Time Warp*, another collection of space-movie music played by the same performers, and it's just not as good.

It's equally well recorded, and a few bits are every bit as much fun to hear (the *Battlestar Galactica* theme and two selections by John Williams). But the cuts composed by Alexander Courage and Jerry Goldsmith are less engaging, and the remainder of the disc is filled up with pieces that aren't space-movie music but just happen to have been used in *2001*: Johann Strauss's *Blue Danube* waltz, Khachaturian's *Gayne* ballet, and Richard Strauss's *Zarathustra* opening (played twice, with appropriate vigor).

I have returned to this disc several times to enjoy its eight minutes of music from *Star Wars* (the honors scene in the imperial throne room and the music heard over the closing titles). The rest isn't worth the price of admission — except, of course, as a hi-fi showpiece, which it most surely is.

— Peter W. Mitchell

Bernstein: *West Side Story* (complete); *On the Waterfront* Suite: assorted artists, Leonard Bernstein conducting. Deutsche Grammophon 415-253. Two discs. Playing time: 98 minutes.

What a sad waste. Bernstein's conducting is incisive and interesting, the orchestra's playing is superb, and the recording is skillfully multimiked — very clear and detailed without any of the phoniness that such miking often produces. Everything about this set is marvelous — except the principal voices, which are disastrously miscast. This recording should have become a classic, a treasure to be saved and savored for years to come. Instead it is constantly irritating, unless you use a CD player's programming controls to skip over the major songs and listen only to the parts that don't involve the lead roles.

Ironically, this recording was effectively condemned by Bernstein himself in his 1949 diary, printed in the program booklet. "The idea of making a musical," he wrote, " that tells a tragic story in musical-comedy terms, using only musical-comedy techniques, never falling into the 'operatic' trap. Can it succeed?" It did succeed of course, in part because, on Broadway and in the movie, the voices of the *West Side Story* actors matched the characters they played. But not in this recording, where Bernstein fell head over heels into the operatic trap in casting the leading roles — especially José Carreras, who is almost comically awful as Tony. Still, with the right voices, operatic casting might have worked: Kurt Ollman (as Riff) and Tatiana Troyanos (as Anita, singing "A Boy like That") abandon operatic stage technique and sing in character, and they are completely believable.

One of these days perhaps CBS will do us (and the composer) a great favor by releasing CD versions of the original Broadway recordings of both *West Side Story* and Bernstein's equally marvelous but neglected *Candide*.

The performance of *On the Waterfront* by the Israel Philharmonic is first-rate. From the clarity of the sound and the lack of audience noise, you'd never guess that it was a live-concert recording, but the jacket says it is.

— P.W.M.

Handel: Organ Concertos, Opus 4 and 7. Simon Preston, Trevor Pinnock, the English Concert. Archiv 413-465 and 413-468. Two two-disc sets. Playing time: 90 and 105 minutes respectively.

These four discs contain a total of 15 concertos for pipe organ and small orchestra, and they are an unalloyed delight from start to finish. During the past three months these recordings have been in my CD player more often than any other. The performances are stylish and lively; the blend between organ and orchestra is excellent; the stereo sound is clear and airy. The recording's only flaw, a minor but common one in CDs, is a slightly too bright and silvery string tone. Occasionally there is the impression that the orchestra is in a more reverberant environment than the organ, but it's quickly forgotten.

— P.W.M.

Copland: *Appalachian Spring, Rodeo, Fanfare for the Common Man.* Atlanta Symphony, Louis Lane conducting. Telarc CD-80078. Playing time: 44 minutes.

With solid performances and superb recordings of Copland's three most popular "American"-style compositions, this disc can't fail to become a hit. In typical Telarc fashion, it begins with the *Fanfare*, the system-buster that will strain the capacity of your amplifier and speakers. (Warning: the orchestral brass is recorded at a lower-than-average level to leave room for the huge peak levels attained by the timpani, bass drum, and tam-tam.)

The performance of *Rodeo* doesn't have the snap of Donald Johanos's classic 1967 Turnabout recording with the Dallas Symphony, and this full-orchestra rendition of *Appalachian Spring* isn't as probing as Dennis Russell Davies's performance of the original chamber-orchestra version on the Pro Arte label. Still, these Atlanta performances are thoroughly enjoyable, and the recorded sound is the best around.

— P.W.M.

Dvořák: Piano Concerto, Opus 33. Rudolf Firkusny with the Saint Louis Symphony, Walter Susskind conducting. Mobile Fidelity MFCD 814. Playing time: 36 minutes.

Firkusny virtually owns the Dvořák piano concerto; hardly anyone else ever plays it. That's okay, because the Czech pianist's performance is splendid. This CD is a re-release of a 1975 Vox/Turnabout analog recording. It doesn't have the transparent clarity and crystalline in-

Continued on page 30

Talking Heads: getting people to listen to music longer

Continued from page 29

ner detail of today's best digital masters, but it is quite good nonetheless.

Most of the recordings in this Turnabout series were originally issued as SQ encoded four-channel discs; the notes don't say whether the SQ matrixed version was used to make the CD, but it would be interesting to play it through an SQ decoder to see whether it becomes clearer.

This is not great music — or at least it's not in the same heroic mold as the Dvořák Cello Concerto. Perhaps pianists aren't drawn to it because it doesn't challenge them as the Tchaikovsky and Brahms concertos do. But it is typically tuneful, thoroughly entertaining, early Dvořák and doesn't deserve its present obscurity. If you buy this disc you may not be overwhelmed, but you'll have a good time, especially in the nostalgic second movement and bouncy third. I just wish Mobile Fidelity had included something else to fill up the disc. At 36 minutes, the CD is half empty.

— P.W.M.

Stravinsky: *Symphony of Psalms.* **Poulenc**: Gloria. Atlanta Symphony Orchestra and Chorus, Robert Shaw conducting. Telarc CD-80105. Playing time: 46 minutes.

These two 20th-century religiously motivated compositions were both written for the Boston Symphony. The Atlanta performances on this disc have the superb clarity and natural balance that we have come to expect from Telarc. They also are good examples of Robert Shaw's conducting; he achieves well-balanced choral singing with uniformly clear (if not exactly idiomatic) diction and orchestra playing that is craftsmanlike but seldom thrilling.

The Laudate that brings Stravinsky's *Symphony of Psalms* to an end is exquisite, but its calm should come as a striking contrast to the turbulence and jagged excitement of what precedes it. There is no excitement here. There's more vigor in the Poulenc, and lyricism too, but still not much excitement. Overall it's a good but not memorable performance. Curiously, the chorus sounds warmer in the Poulenc, and more fully blended with the orchestra; in the Stravinsky the choral sound is cooler and more sharply etched — nicely complementing the character of the music.

— P.W.M.

Bach: Three Keyboard Concertos (BWV 1052, 1055, and 1056). András Schiff with the English Chamber Orchestra, George Malcolm conducting. Denon 35C37-7236. Playing time: 48 minutes.

If you want to hear Bach's clavier concertos on a full-size Steinway piano, this is your cup of tea. (Of course, since these pieces apparently began as violin concertos and were reworked for keyboard by Bach, perhaps it's silly to cavil at the choice of instrument.) Schiff makes effective use of his pianistic resources, shaping phrases with subtle dynamic shadings that would be difficult to achieve on a harpsichord. After I got used to the anachronistic sound, I enjoyed these performances a great deal, and I'll probably return to them often.

Sonically this record has one weakness and one strength. Its strength lies in the exceptionally smooth string sound, without any trace of the brightness and stridency that sometimes occurs in digital recordings. (It's possible, of course, that the CD was actually made, not from the digital master, but from the analog back-up tape that was recorded at the sessions.) The weakness is that an accent mike was placed too close to the piano, so in playback the piano sounds much closer to the listener than the orchestra does.

— P.W.M.

Beethoven: *Fidelio* Overture, Symphony No. 7. Performed by Octophorus. Accent BRT-3. Playing time: 39 minutes.

In Beethoven's time, when recordings hadn't yet been invented and symphony orchestras were still fairly rare, orchestral music was also published in scaled-down versions for keyboard and for chamber ensembles. A decade ago Glenn Gould recorded a solo piano performance of Beethoven's Fifth Symphony, and, though the outer movements suffered from the reduction, the slow movement was every bit as convincing on the piano as it is when played by a full orchestra.

On this excellent Belgian recording, the performing group is a "harmonie," a nine-piece ensemble of wind instruments (clarinets, oboes, horns, and bassoons). The symphony orchestra of Beethoven's time consisted essentially of a string orchestra plus a harmonie. In the Seventh Symphony, a great deal of the motivic flow of the music is carried by the winds, so the omission of the strings in this harmonie arrangement doesn't change the basic character of the symphony at all. Without trumpets the festive parts aren't as gay, and with fewer players the fast parts don't sound as rushed and flustered. Nevertheless, much of the symphony comes out sounding fresh, clean, and uncomplicated. Many of the contrapuntal lines and filigrees that get lost in the crowded sound of an orchestra performance are easier to hear in this intimate presentation.

— P.W.M.

Mozart: Horn Quintet; *Eine kleine Nachtmusik; A Musical Joke.* Berlin Philharmonia Quartet. Denon 38C37-7229. Playing time: 49 minutes.

This is another scaled-down presentation. The music this time is Mozart's "night music" serenade, played with just one performer per part (the string quartet plus a double bass). The microphones are close enough to the quintet to produce a big, rich sound that is just as tonally satisfying as that of a small orchestra, and the pared-down performance yields a degree of clarity and precise articulation that an orchestra would have difficulty matching. By comparison, orchestral performances seem inflated and ungainly.

In the Horn Quintet, and again in the *Musical Joke* (which involves two deliberately mistuned horns), the playing is as superb as the recording. These pieces, however, are more distantly miked than the *Nachtmusik* in order to provide an appropriately large sonic frame for the horn sound. This produces a startling change in sonic perspective between the pieces when the disc is played straight through. Also, the naturalistic recording balance faithfully preserves the dominance of the big-horn sound over the strings in the Quintet; next to the Brucknerian tonal weight of the horn, the strings seem a bit thin. It would be interesting to hear a performance using original instruments and thus a smaller horn.

— P.W.M.

Mozart: *Eine kleine Nachtmusik;* Posthorn Serenade. Prague Chamber Orchestra, Charles Mackerras conducting. Telarc CD-80108. Playing time: 65 minutes.

The two recordings and performances on this disc are quite different. Your preference may depend on the tonal balance of your speakers and your taste in stylistic matters, but you're not likely to be happy with both. The *Nachtmusik* is a smoothed-over performance, pleasant but undistinguished, and it is discreetly miked at a distance, yielding a well-blended sound without any of the bite that many people find objectionable in CDs — but, if your speakers tend toward a mellow tonal balance, this recording may seem veiled and dull.

The *Posthorn* Serenade has a closer, brighter, more aggressive and detailed sound (with more obvious hall reverb as well), and the performance is also a lot more vigorous, becoming almost scrappy at points. But it is several decibels louder, and the channel balance seems tilted toward the left; it sounds better with the balance knob turned to two o'clock. The later movements, in particular, have the exaggerated hi-fi sound of a British Decca (London) recording: close miked for lots of detail but also surrounded by cavernous reverb. (That, with the genial playing and almost giddy posthorn solo, make it great fun to hear.) Not surprisingly, the fine print reveals that this record was produced by James Mallinson of Decca, not by Bob Woods of Telarc.

— P.W.M.

Schumann: *Symphony No. 2; Manfred* overture. Vienna Philharmonic, Giuseppe Sinopoli conducting. Deutsche Grammophon 410-863. Playing time: 50 minutes.

This dynamic, sinewy, sometimes manic performance is an effective antidote to the idea that Schumann was a soft-centered Romantic composer — or an incompetent orchestrator. In Sinopoli's performance, Schumann comes across as a precursor of Mahler-like psychodrama, by turns brooding languorously and racing frantically ahead to the next modulation. The orchestra plays with demonic intensity, dynamically shaping both phrases and individual notes. It all works: Sinopoli finds in (or imposes on) the music a dramatic continuity, a sense of architectural unity and cumulative power, that I have not heard in other performances of this symphony. This is not the tuneful but aimless ramble that Schumann's symphonies often seem to be, but a roller-coaster ride of ever-increasing tension and speed.

The recording complements the performance. It's not seductively beautiful, but it is very clear and has a large dynamic range, with the exaggerated image depth that is characteristic of recordings made with only two widely spaced omnidirectional microphones.

— P.W.M.

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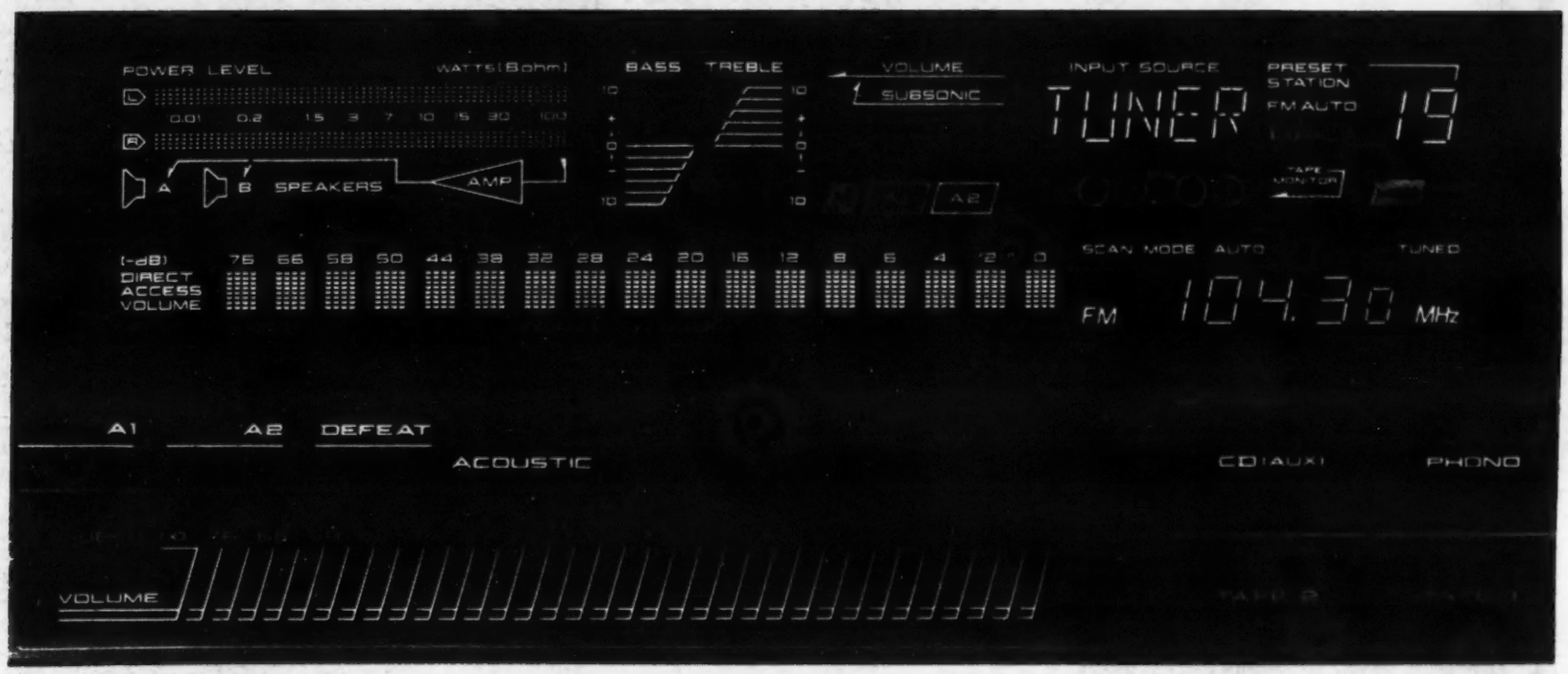

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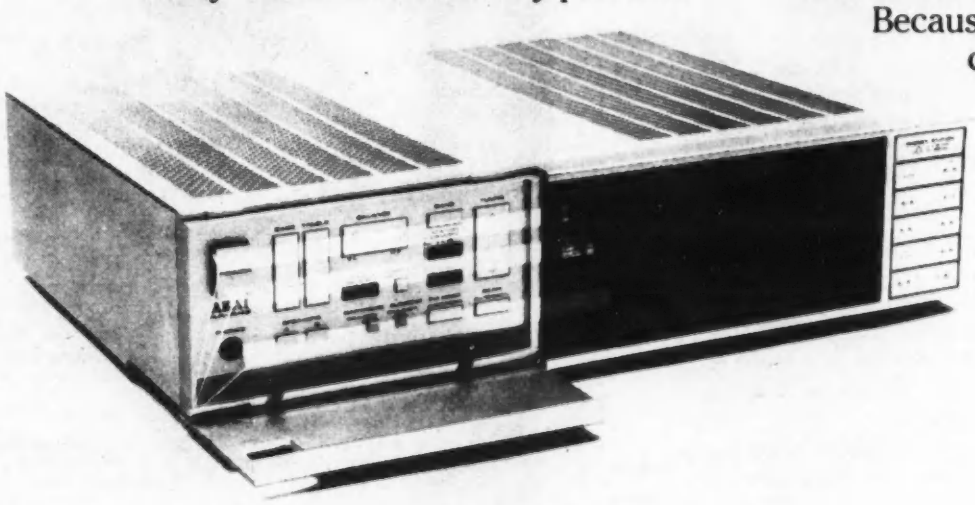

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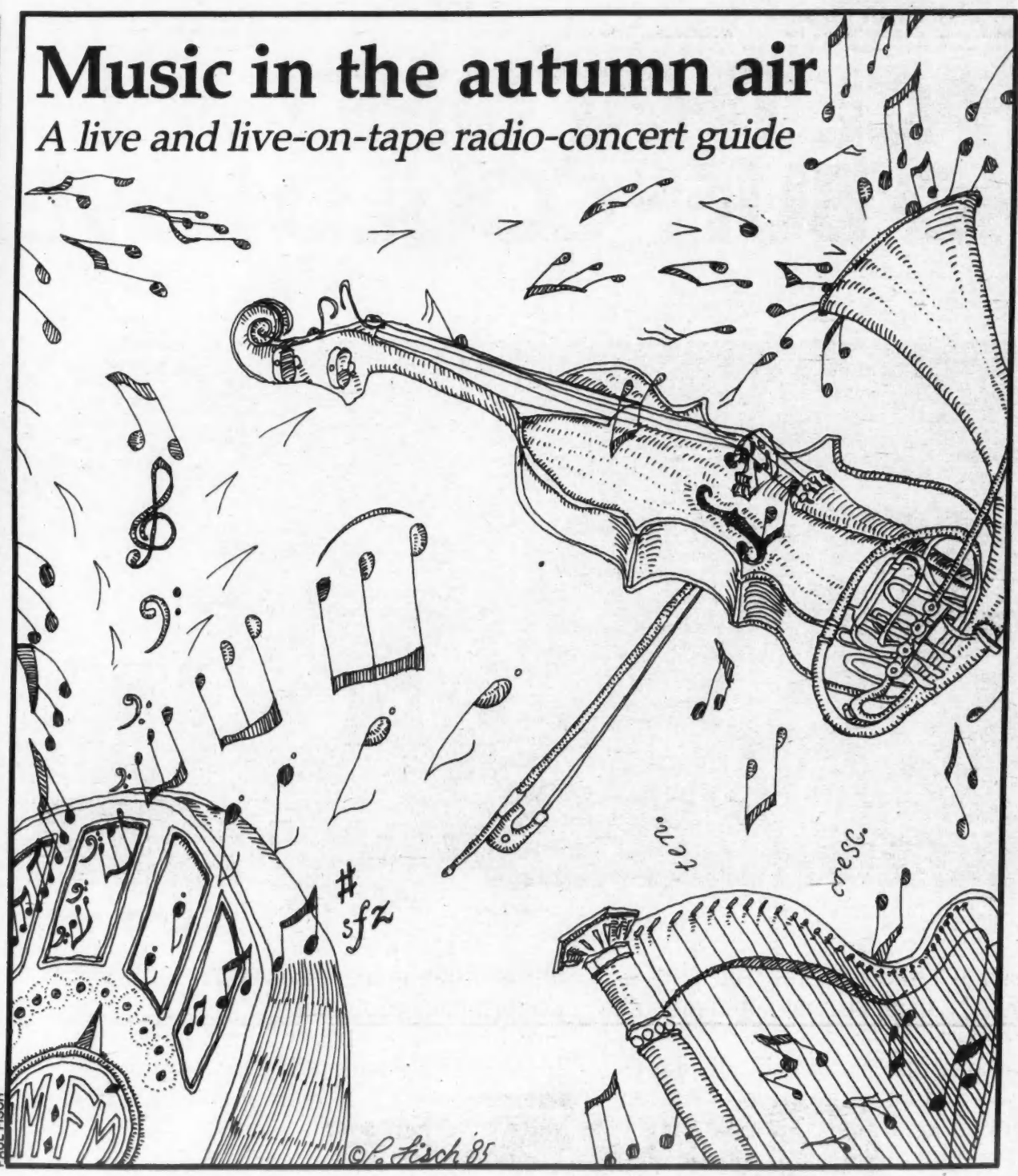

Compiled by Frederick Kalil

Boston radio offers something for everyone, be it the sweet strings of classical music, the twang of country music, or the run-of-the-mill Top 40/commercial rock that threatens to overwhelm all. For those who seek the unusual — experimental, ethnic, international — the college and public stations offer a variety of well-produced and well-thought-out programming. Classical music is particularly well represented — proof of the abundance of fine classical shows on the air. To help you sort through everything, the following listings spotlight live and taped concerts and special performances being broadcast from now through November. (They thin out toward the end because program information is not always available months in advance; this does not mean there will be fewer offerings.) For more details, see "Airwaves," the weekly radio-listings column in the Phoenix*'s Arts section.*

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Noted below are programs for which no advance information is available.

Metrowave. This show, featuring rock groups from the New England area, is broadcast through mid-September on Sunday evenings from 8 to 11 on WERS.

On the Town. Another show featuring rock music — local and live. This one can be heard on WMFO on Wednesday evenings at 8:30.

Saturday, September 7

9:00 a.m. (WCRB) Montreal Symphony Orchestra. Raymond Leppard conducts a Handel program: the Concerto Grosso in C from *Alexander's Feast*, the cantata *Apollo e Dafne*, with Harper and Duesing, and the *Music for the Royal Fireworks*.

8:00 (WCRB) Boston Symphony Orchestra. From a concert given last February 15, Raymond Leppard conducts acts one and two of Handel's *Acis and Galatea*, with Marshall, Myers, Britton, and White.

8:00 (WGBH) Arlo Guthrie and Pete Seeger at Wolf Trap. Live on tape from a concert recorded on August 26, this folk duo punctuate their music with commentary about American folk history, politics, and social consciousness.

Sunday, September 8

Noon (WCRB) Carnegie Hall Tonight. Barry Tuckwell conducts the Northern Sinfonia of England in Williamson's *Lament* for Violin and Strings, Stravinsky's *Dumbarton Oaks* Concerto, and Mozart's Symphony No. 33.

1:00 (WGBH) Eleanor Naylor Dana Series. From the Bratislava Festival, Kurt Masur conducts the Leipzig Gewandhaus Orchestra in Cikker's *Ode to Joy*, with Blahusiaková, Stracenska, Livora, Galla, and Chudik, and Beethoven's Symphony No. 7.

6:00 (WGBH) New England Summer Radio Festival. The Portland String Quartet performs Mozart's String Quartet No. 19 (*Dissonant*), Bloch's String Quartet No. 3, and Chadwick's String Quartet No. 4.

Monday, September 9

8:00 (WGBH) Eric in the Evening. Saxophonist Jerome Richardson in concert from the Four Queens Hotel in Las Vegas.

9:00 (WCRB) San Francisco Symphony Orchestra. Alexander Schneider conducts Bach's *Brandenburg Concerto* No. 5, Devienne's Flute Concerto No. 7, with Ransom Wilson, Mozart's Piano Concerto No. 11, with Stephanie Brown, and Haydn's Symphony No. 78.

Tuesday, September 10

9:00 (WCRB) Music from Marlboro. Danzi's Quartet Opus 40 No. 3, Ravel's *Trois poèmes de Stéphane Mallarmé*, Stravinsky's *Three Songs from William Shakespeare*, four songs by Rorem, and Mendelssohn's String Quartet No. 3.

Wednesday, September 11

9:00 (WCRB) Cleveland Orchestra. Christopher Hogwood conducts a Handel program: the *Water Music*, one of the Concerti a due cori, and *Music for the Royal Fireworks*.

Thursday, September 12

9:00 (WCRB) New York Philharmonic. Zubin Mehta conducts Haydn's Symphony No. 22 (*Philosopher*), the Suite No. 2 from Ravel's *Daphnis et Chloé*, and Beethoven's Piano Concerto No. 5 (*Emperor*), with Claudio Arrau.

Friday, September 13

12:30 (WBUR) The New School of Music. Violinist Peter Zazofsky, with pianist David Deveau, performs Mozart's Violin Sonata K.304, Beethoven's Violin Sonata No. 9 (*Kreutzer*), Bading's Capriccio for Violin and Tape, Saint-Saëns's *Havanaise*, Szymanowski's Nocturne and Tarantella, and Sarasate's Introduction and Tarantella.

9:00 (WCRB) Boston Symphony Orchestra. From a concert given last February 22, Myung-Whun Chung conducts the Overture to Rossini's *L'Italiana in Algeri*, the Elgar Cello Concerto, with Ralph Kirshbaum, and Prokofiev's Symphony No. 6.

Saturday, September 14

9:00 a.m. (WCRB) Montreal Symphony Orchestra. Charles Dutoit conducts Stravinsky's *Scherzo fantastique*, Beethoven's Piano Concerto No. 3, with Murray Perahia, and Stravinsky's *The Firebird* (1910 version).

7:00 (WBUR) Boston Arts Festival. David Stockton conducts Gilbert and Sullivan's *H.M.S. Pinafore*.

8:00 (WCRB) Boston Symphony Orchestra. From a concert given last March 1, Kurt Masur conducts Berg's *Lulu* Suite and Handel's *Ode for St. Cecilia's Day*, with Robinson and Cole.

8:00 (WGBH) Yo-Yo Ma in Concert. The program includes Bach's Suite No. 6, Brahms's Cello Sonata No. 1, Messiaen's *L'ouange à l'éternité de Jesus Christ* (from *Quartet for the End of Time*), Beethoven's Cello Sonata No. 4, Chopin's Introduction and Polonaise brilliante, and Tchaikovsky's *Melodie*.

Sunday, September 15

Noon (WCRB) Carnegie Hall Tonight. Baritone Simon Estes, with pianist Paul Liljestrand, performs Mozart's concert aria "Per questa bella mano," Wolf's *Michelangelo Lieder*, and Brahms's *Four Serious Songs*.

1:00 (WGBH) Eleanor Naylor Dana Series. From the Bratislava Festival, "The Moscow Virtuosos": Vladimir Spivakov conducts Bach's Concerto for Violin and Oboe, with himself and Alexei Utkin as solists, Shostakovich's Concerto No. 1 for Piano, Trumpet, and Strings, with Vladimir Krainev and Karol Luspai, and Tchaikovsky's *Serenade for Strings*.

2:00 (WBUR) Boston Concert Opera. David Stockton conducts Puccini's *La rondine*.

6:00 (WGBH) New England Summer Radio Festival. A concert from the Monadnock Music Festival: Skalkottas's Concertino for Oboe and Piano, Fauré's Piano Quintet in C minor, and Schumann's String Quartet No. 3.

7:00 (WBUR) Boston Musica Viva. "Third Stream and All That Jazz." McKinley's Concerto for Bass, Bass Clarinet, and Ensemble, Ellington's "Creole Love Song" and "St. Louis Toodeloo," Whiteman's "Aunt Haggar's Blues," Schuller's "Transformation," Russell's "All About Rosie," Mingus's "Revelations," and Babbitt's "All Set."

Monday, September 16

8:00 (WBUR) Boston Arts Festival. Collage perform Crumb's *Voice of the Whale*, the Ives Piano Trio, and McKinley's *Two Entrade*.

9:00 (WCRB) San Francisco Symphony Orchestra. Edo de Waart conducts Haydn's Symphony No. 26 (*Lamentatione*) and act three of Wagner's *Parsifal*, with Kollo, Lloyd, and Cheek.

Tuesday, September 17

8:00 (WGBH) Eric in the Evening. The George Cables Trio, joined by bassist Gary Peacock and drummer Victor Lewis, is featured in a pre-recorded performance from Jazz Alley Downtown in Seattle.

9:00 (WCRB) Music from Marlboro. The Ravel String Quartet, Schoenberg songs from Opus 2, and the Mendelssohn Octet.

Wednesday, September 18

9:00 (WCRB) Cleveland Orchestra. Maxim Shostakovich conducts Tchaikovsky's *Romeo and Juliet* Fantasy-Overture, Prokofiev's Piano Concerto No. 1, with Malcolm Frager, and Mahler's Symphony No. 1.

Thursday, September 19

9:00 (WCRB) New York Philharmonic. Zubin Mehta conducts Webern's *Im Sommerwind* and Six Pieces for Orchestra and Mahler's *Das Lied von der Erde*, with Fassbänder and Rendall.

Friday, September 20

12:30 (WBUR) Charles River Concerts. Pianist Seth Kimmelman performs Carter's Piano Sonata, selections from Helps's *Trois images*, "Hawthorne" from Ives's Sonata No. 2 (*Concord*), Schumann's Sonata in G minor, selected song transcriptions by Franz Liszt, and Scriabin's Fantasy in B minor.

9:00 (WCRB) Boston Symphony Orchestra. From a concert given last March 8, Adam Fischer conducts Beethoven's *Creatures of Prometheus* Overture and the Piano Concerto No. 4, with Krystian Zimerman, and Bartók's *Romanian Folk Dances* and *Miraculous Mandarin* Suite.

9:00 (WGBH) Cincinnati May Festival. James Conlon conducts the Cincinnati Symphony in Bernstein's *Chichester Psalms* and Janáček's *M'ša glagolskaja*, with Haywood, Takács, Lakes and Kopčhák.

Saturday, September 21

9:00 a.m. (WCRB) Montreal Symphony Orchestra. Zubin Mehta conducts Wagner's *Rienzi* Overture, Schoenberg's Chamber Symphony No. 1, and Tchaikovsky's Symphony No. 6 (*Pathétique*).

8:00 (WCRB) Boston Symphony Orchestra. From a concert given last March 15, Maurizio Pollini conducts and is soloist in a Mozart program: Piano Concerto No. 12, Symphony No. 34, and Piano Concerto No. 17.

8:00 (WGBH) British Festival. Neville Marriner conducts the Minnesota Orchestra in Bliss's *Fanfare Prelude*, Handel's "The King Shall Rejoice," from *Zadok the Priest*, Elgar's *Sea Pictures*, and Vaughan Williams's Symphony No. 2 (*London*).

Sunday, September 22

Noon (WCRB) Carnegie Hall Tonight. Violinist Salvatore Accardo, with pianist Bruno Canino, plays Beethoven's Violin Sonata No. 7 and Ravel's *Tzigane*.

1:00 (WGBH) Eleanor Naylor Dana Series. From the Bratislava Festival, Oliver Dohnányi conducts the Slovak Philharmonic in Chopin's Piano Concerto No. 1, with Dang Thai Son, and Jan Valta conducts the State Orchestra of Zilina in Moyzes's *Divertimento for Small Orchestra*, Pironkov's *The True Defense of Socrates*, with bass Pavel Gerdzshikov, and Voříšek's Symphony in D.

2:00 (WBUR) Boston Concert Opera. David Stockton conducts Bellini's *I Capulati e i Montecchi*.

6:00 (WGBH) Cape and Islands Festival. Pianist Samuel Sanders, violinists Stephanie Chase and Barry Ross, violist Karen Dreyfus, and cellists Nathaniel Rosen and Jennifer Langham perform Mozart's Duo for Violin and Viola K.423, Menotti's Suite for Two Cellos and Piano, and Schubert's Quintet D.956.

7:00 (WBUR) Boston Musica Viva. "Black American Composers." Smith's Introduction, Cadenzas, and Interludes for Eight Players, Still's Folk Suites Nos. 2 and 4, Anderson's *Beyond Silence*, Wilson's *Echoes*, Logan's *Proportions*, and Joplin's *Ragtime Dance*.

Monday, September 23

8:00 (WGBH) Eric in the Evening. Saxophonist Joe Henderson is featured in a pre-recorded concert from Detroit's Institute for the Arts.

9:00 (WCRB) San Francisco Symphony Orchestra. Antal Doráti conducts Bartók's Two Portraits for Orchestra, his own Piano Concerto, with Ilse von Alpenheim, and Dvořák's Symphony No. 8.

Tuesday, September 24

9:00 (WCRB) Music from Marlboro. Busch's Psalm 130, Ravel's *Chansons madécasses*, Beethoven's Piano Trio No. 5, and Bach's *Brandenburg Concerto* No. 6.

Wednesday, September 25

9:00 (WCRB) Cleveland Orchestra. Charles Dutoit conducts the Overture to Verdi's *La forza del destino*, the Tchaikovsky Violin Concerto, with Dong-Suk Kong, and Schumann's Symphony No. 4.

Thursday, September 26

9:00 (WCRB) New York Philharmonic. Raymond Leppard conducts a Handel program: the Concerto a due cori in B-flat, the *La Lucrezia* Cantata, with Cynthia Clarey, the Violin Sonata in B-flat, with Carol Webb, and *Music for the Royal Fireworks*.

Friday, September 27

12:30 (WBUR) Bach Organ Marathon. Mireille Lagacé performs the Prelude and Fugue BWV 536, the Leipzig Chorale Preludes BWV 665 and 666, the Concerto in D minor BWV 596, and the Prelude and Fugue in F minor BWV 534.

9:00 (WCRB) Boston Symphony Orchestra. From a concert given last March 27, Andrew Davis conducts Mozart's Symphony No. 37, the Stravinsky Violin Concerto, with Cho-Liang Lin, and Rachmaninov's *Symphonic Dances*.

9:00 (WGBH) Cincinnati May Festival. James Conlon conducts the Cincinnati Symphony in Liszt's *Christus*, with Valente, Takács, Aler, and Shirley-Quirk.

Saturday, September 28

9:00 a.m. (WCRB) Montreal Symphony Orchestra. Charles Dutoit conducts Berlioz's *Roman Carnival* Overture, Beethoven's Piano Concerto No. 1, with Rudolf Serkin, Stravinsky's *Le chant du rossignol*, and Suite No. 2 from Ravel's *Daphnis et Chloé*.

WATD	**90.0 FM**
WBUR	**90.9 FM**
WCRB	**102.5 FM**
WERS	**88.9 FM**
WGBH	**89.7 FM**
WICN	**90.5 FM**

7:00 (WBUR) Bach Organ Marathon. Mireille Lagacé performs the Prelude and Fugue in D minor BWV 532, the *Orgelbüchlein* Chorales BWV 614 and 615, Sonata No. 1 BWV 525, Partita Diversa BWV 766, and the Toccata and Fugue in F major BWV 540.
8:00 (WCRB) Boston Symphony Orchestra. From a concert given last April 5, Andrew Davis conducts Knussen's Symphony No. 3, Delius's *Sea Drift*, with Richard Stilwell, and Vaughan Williams's Symphony No. 2 (*London*).
8:00 (WGBH) British Festival. Stephen Cleobury directs the Choir of King's College Chapel in works by Sweelinck, di Lasso, Byrd, Blow, Wesley, Boyce, Bax, Argento, and Brahms.

Sunday, September 29

Noon (WCRB) Carnegie Hall Tonight. Claudio Abbado conducts the Chamber Orchestra of Europe in Brahms's Serenade No. 1.
1:00 (WGBH) Eleanor Naylor Dana Series. From the Bratislava Festival, Alexander Lazarev conducts the Leningrad Philharmonic in Petrov's *In Memory of the Leningrad Blockade*, Prokofiev's Violin Concerto No. 2, with Sergei Stadler, and Mussorgsky's *Pictures at an Exhibition*.
6:00 (WGBH) Mohawk Trail Concerts. Pianist William Bolcom and mezzo-soprano Joan Morris, with violinist Masako Yanagita and cellist Gabriel Morales, in a program that includes Kodály's Duo for Violin and Cello, piano rags by Scott Joplin, Bolcom's *Dead Moth Tango*, and a selection of French and American popular songs.
7:00 (WBUR) Boston Musica Viva. "New England Composers Competition Concert." Swafford's *Labyrinths*, Yim's *Timescreen #1*, Three Songs from Merryman's *Antigone*, Cowell's *Twenty-Six Simultaneous Mosaics*, and Schoenberg's Chamber Symphony No. 1 as arranged by Webern.

Monday, September 30

8:00 (WBUR) Paratore Brothers. Pianists Anthony and Joseph Paratore perform Mussorgsky's *Pictures at an Exhibition*.

Tuesday, October 1

8:00 (WGBH) Eric in the Evening. From a concert recorded at the Berklee Performance Center, performances by the John Scofield Quintet, the Bob Moses Sextet, and solo pianist Anthony Davis.
9:00 (WCRB) Chicago Symphony Orchestra. Georg Solti conducts Verdi's *Falstaff*, with Sarabia, Brendel, Ludwig, Ricciarelli, Murray, Battle, Egerton, Haugland, and Zednik.

Wednesday, October 2

9:00 (WCRB) Cleveland Orchestra. Charles Dutoit conducts Haydn's *The Creation*, with Bouleyn, Rosenshein, and Cheek.

Thursday, October 3

9:00 (WCRB) New York Philharmonic. Erich Leinsdorf conducts Copland's *Music for the Theater*, Bartók's Piano Concerto No. 3, with Malcolm Frager, and Brahms's Symphony No. 2.

Friday, October 4

12:30 (WBUR) Pro Arte Chamber Orchestra of Boston. Armando Alfonso conducts a program of Spanish music, with tenor soloist Miguel Cortez, including works by Soler, Arriaga, Montsalvage, Vives, Soutullo, Granados, Torroba, Gimenez, and Chapi.
2:00 (WGBH) Boston Symphony Orchestra. (live) Seiji Ozawa conducts Shostakovich's Violin Concerto No. 1, with Itzhak Perlman, and Brahms's Symphony No. 1.
8:00 (WGBH) Schütz Festival. David Hoose conducts a program of Schütz's *Cantiones sacrae*.
9:00 (WCRB) Boston Symphony Orchestra. From a concert given last April 12, Charles Dutoit conducts Dutilleux's *Métaboles*, Mozart's Piano Concerto No. 24, with András Schiff, and Stravinsky's *Petrouchka*.

Saturday, October 5

9:00 a.m. (WCRB) Philadelphia Orchestra. Riccardo Muti conducts the Overture to Verdi's *Luisa Miller*, Copland's Symphony No. 3, and Beethoven's Piano Concerto No. 5 (*Emperor*), with Alfred Brendel.
8:00 (WCRB) and (WGBH) Boston Symphony Orchestra (live). See the listing for Friday, October 4, at 2 p.m.

Sunday, October 6

Noon (WCRB) Carnegie Hall Tonight. Klaus Tennstedt conducts the London Philharmonic in Brahms's Symphony No. 1.
1:00 (WGBH) Eleanor Naylor Dana Series. From Sweden, a concert by the Swedish Radio Choir.
8:00 (WBUR) Dinosaur Annex. Turner's Scherzo, Martino's Trio, Copland's Sextet, and Sims's Sextet.

Tuesday, October 8

8:00 (WGBH) Eric in the Evening. Vocalist Carol Sloane and baritone saxophonist Pepper Adams in a performance recorded at Detroit's Institute for the Arts.
9:00 (WCRB) Chicago Symphony Orchestra. Georg Solti conducts Shostakovich's Symphony No. 9 and Bruckner's Symphony No. 9.

Wednesday, October 9

9:00 (WCRB) Cleveland Orchestra. Jahja Ling conducts Barber's *Medea's Dance of Vengeance*, the Copland Clarinet Concerto, with Franklin Cohen, and Tchaikovsky's Symphony No. 2 (*Little Russian*).

Thursday, October 10

9:00 (WCRB) New York Philharmonic. Zubin Mehta conducts C.P.E. Bach's Concerto for Flute, Strings, and Continuo in D minor and Mahler's Symphony No. 5.

Friday, October 11

8:00 (WGBH) Schütz Festival. Emmanuel Music is led by Craig Smith in a program of works by Schütz, Schein, Monteverdi, and Gabrieli.
9:00 (WCRB) Boston Symphony Orchestra. From a concert given last April 19, Seiji Ozawa conducts Mendelssohn's Symphony No. 5 (*Reformation*), Lalo's *Symphonie espagnole*, with violinist Anne-Sophie Mutter, and Ravel's *Alborada del gracioso*.

Saturday, October 12

9:00 a.m. (WCRB) Philadelphia Orchestra. Klaus Tennstedt conducts Richard Strauss's *Till Eulenspiegel*, the Hindemith Cello Concerto, with János Starker, and Strauss's *Also sprach Zarathustra*.
8:00 (WCRB) Boston Symphony Orchestra. From a concert given last April 26, Seiji Ozawa conducts Stravinsky's *Monumentum pro Gesualdo*, Prokofiev's Piano Concerto No. 3, with Alexander Toradze, and Nielsen's Symphony No. 3 (*Sinfonia espansiva*).
8:00 (WGBH) Sagra Musicale Umbria. Gianluigi Gelmetti conducts the RAI Orchestra and Chorus in Salieri's *Les Danaïdes*, with Caballé, LaFont, Bladin, Martin, and Trabucco.

Sunday, October 13

Noon (WCRB) Carnegie Hall Tonight. David Zinman conducts the Baltimore Symphony in Wuorinen's *Crossfire* and the Dvořák Violin Concerto, with Joseph Silverstein.
1:00 (WGBH) Eleanor Naylor Dana Series. Pianist Murray Perahia plays Bach's Partita No. 4, Beethoven's Piano Sonata No. 26 (*Les adieux*), Bartók's Suite for Piano, and Chopin's Piano Sonata No. 3.
3:00 (WCRB) National Symphony Orchestra. Mstislav Rostropovich conducts Beethoven's *Fidelio* Overture, Albert's *RiverRun* (world première), and Beethoven's Symphony No. 6 (*Pastorale*).
8:00 (WBUR) Dinosaur Annex. Program includes Thompson's *Collected Poems*.

Tuesday, October 15

9:00 (WCRB) Chicago Symphony Orchestra. Georg Solti conducts Beethoven's *Missa solemnis*, with Lott, Montague, Jerusalem, and Estes.

Wednesday, October 16

9:00 (WCRB) Cleveland Orchestra. Jahja Ling conducts Weber's *Oberon* Overture, Mendelssohn's Piano Concerto No. 1, with Rudolf Firkusny, and Sibelius's Symphony No. 2.

Thursday, October 17

9:00 (WCRB) New York Philharmonic. Jiří Bělohlávek conducts Bartók's Divertimento, Beethoven's Piano Concerto No. 1, with Jeffrey Kahane, and Dvořák's Symphony No. 7.

Friday, October 18

2:00 (WGBH) Boston Symphony Orchestra (live). Seiji Ozawa conducts the Tchaikovsky Violin Concerto, with Viktoria Mullova, and excerpts from Prokofiev's *Romeo and Juliet*.
8:00 (WGBH) Schütz Festival. Emmanuel Music is led by Craig Smith in a program of works by Marenzio, Monteverdi, Gesualdo, Schütz, Schein, and Grandi.
9:00 (WCRB) Boston Symphony Orchestra. From a concert given October 26, 1984, Seiji Ozawa conducts Haydn's Symphony No. 6 (*Le matin*), Adams's *Shaker Loops*, and Richard Strauss's *Don Quixote*, with cellist Yo-Yo Ma.

Saturday, October 19

9:00 a.m. (WCRB) Philadelphia Orchestra. Riccardo Muti conducts Fine's Notturno for Strings and Harp, Richard Strauss's Duet-Concertino for Clarinet, Bassoon, Strings, and Harp, and Beethoven's Symphony No. 4.
2:00 (WCRB) Canadian National Opera. Cal Stewart Kellogg conducts Verdi's *Il trovatore*, with Castro-Alberty, Budai, Beaupré, Mauro, and Wells.
7:00 (WBUR) Dinosaur Annex. Peyton's *Songs from T. Sturge Moore*, Amy Reich's *Holograph Dances*, Lister's *A Little Cowboy Music*, Boykan's Trio, and Kiraly's *Two Folksongs and an Abstract*.
8:00 (WCRB) and (WGBH) Boston Symphony Orchestra (live). See the listing for Friday, October 18, at 2 p.m.

Sunday, October 20

Noon (WCRB) Carnegie Hall Tonight. James Conlon conducts the Rotterdam Philharmonic in the Prelude to Janáček's *Jealousy* and Dvořák's Symphony No.7.
1:00 (WGBH) Eleanor Naylor Dana Series. Kurt Masur conducts the Leipzig Gewandhaus Orchestra in a Brahms program: the Concerto for Violin and Cello, with Gidon Kremer and Yo-Yo Ma, and the Symphony No. 4.
3:00 (WCRB) National Symphony Orchestra. Mstislav Rostropovich conducts Glinka's *Jota aragonesa*, Mozart's Piano Concerto No. 26 (*Coronation*), with Alicia de Larrocha, and Brahms's Symphony No. 3.
7:00 (WBUR) Zimbalist Celebration. In honor of Efrem Zimbalist's 94th birthday: the String Quartet in E minor, the Fantasy for Oboe, String Quartet, and Piano, and the Miniatures and Impressions for Piano and String Quartet.

Tuesday, October 22

9:00 (WCRB) Chicago Symphony Orchestra. Georg Solti conducts Corigliano's *Tournaments* Overture, Mozart's Symphony No. 39, and Tchaikovsky's Symphony No. 4.

Wednesday, October 23

9:00 (WCRB) Cleveland Orchestra. Yoel Levi conducts Barber's *School for Scandal* Overture, Mozart's Horn Concertos Nos. 1 and 4, with Barry Tuckwell, and Stravinsky's *Le sacre du printemps*.

Thursday, October 24

9:00 (WCRB) New York Philharmonic. Zubin Mehta conducts Prokofiev's *Alexander Nevsky*, with Galina Vishnevskaya, and scenes from Mussorgsky's *Boris Godunov*, with Salminen.

Friday, October 25

2:00 (WGBH) Boston Symphony Orchestra (live). Giuseppe Sinopoli conducts a Brahms program: the Violin Concerto, with Uto Ughi, and Symphony No. 4.
8:00 (WGBH) Schütz Festival. David Hoose directs the Cantata Singers in a program of works by Schütz, Schein, Monteverdi, and Gabrieli.
9:00 (WCRB) Boston Symphony Orchestra. From a concert given August 31, 1984, Seiji Ozawa conducts Beethoven's Symphony No. 4 and the Dvořák Cello Concerto, with Yo-Yo Ma.

Saturday, October 26

9:00 a.m. (WCRB) Philadelphia Orchestra. Rafael Frühbeck de Burgos conducts Haydn's Symphony No. 100 (*Military*), Bartók's Piano Concerto No. 2, with Garrick Ohlsson, and the Suites Nos. 1 and 2 from Ravel's *Daphnis et Chloé*.
2:00 (WCRB) Canadian National Opera. Derek Bate conducts Bizet's

Continued on page 34

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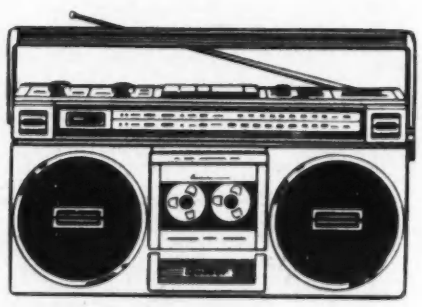

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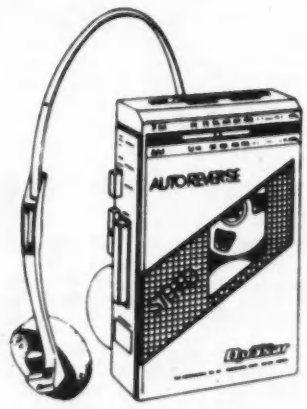

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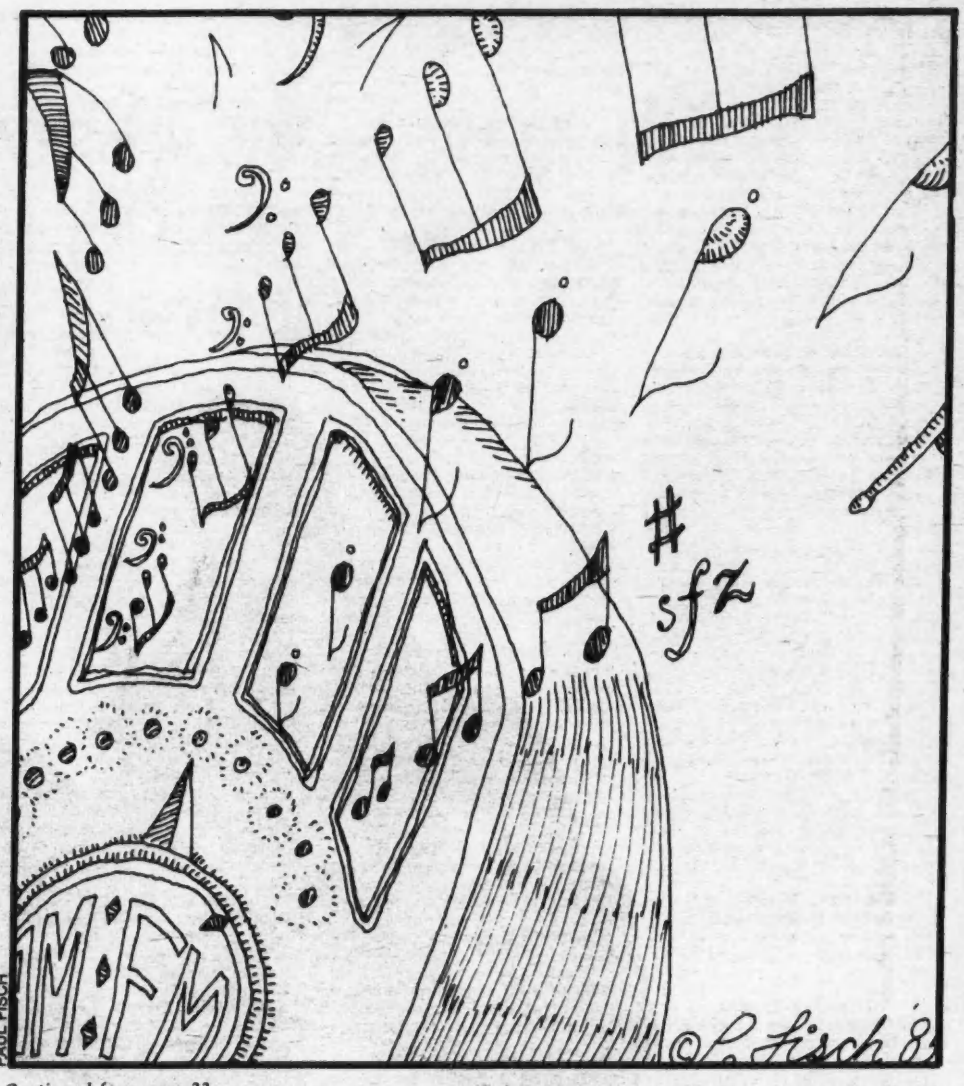

PAUL FISCH

Continued from page 33

Carmen, with Ringo, Theyard, Fanning, Dodington, Kolomyjec, and Devlin.
7:00 (WBUR) Anthony di Bonaventura in Recital. A program of piano works by Scarlatti.
8:00 (WCRB) and (WGBH) Boston Symphony Orchestra (live). See the listing for Friday, October 25, at 2 p.m.

Sunday, October 27

Noon (WCRB) Carnegie Hall Tonight. Pianist Alfred Brendel plays Haydn's Piano Sonata in E-flat Hob.XVI/52 and Schubert's *Wanderer Fantasie*.
1:00 (WGBH) Eleanor Naylor Dana Series. Christoph von Dohnányi conducts the Vienna Symphony in Bartók's Two Portraits for Orchestra, with Jan Pospichal, and Divertimento and Brahms's Piano Concerto No. 2, with Oleg Maisenberg.
3:00 (WCRB) National Symphony Orchestra. Mstislav Rostropovich conducts Sibelius's *Karelia* Overture and Symphony No. 4 and scenes from Mussorgsky's *Boris Godunov*, with Matti Salminen.
8:00 (WBUR) Anthony di Bonaventura in Recital. The program includes Beethoven's Piano Sonata No. 30, Mozart's Piano Sonata No. 17, and Schumann's *Carnaval*.

Tuesday, October 29

9:00 (WCRB) Chicago Symphony Orchestra. James Levine conducts Mendelssohn's Symphony No. 4 (*Italian*), "Ernani, involami," from Verdi's *Ernani*, and "D'amor sull'ali rosee," from *Il trovatore*, the Prelude and Liebestod from Wagner's *Tristan und Isolde*, and the Dance of the Seven Veils and Final Scene from Richard Strauss's *Salome*. The soloist is soprano Leontyne Price.

Wednesday, October 30

9:00 (WCRB) Cleveland Orchestra. Yoshimi Takeda conducts Koyama's *Kobiki-uda, a Woodcutter's Song*, Bach's Flute Concerto in C, with Jean-Pierre Rampal, Cimarosa's Concertante for Two Flutes, with Rampal and Jeffrey Kahner, and Berlioz's *Symphonie fantastique*.

Thursday, October 31

8:00 (WGBH) L'Orchestre de la Suisse Romande (live). From Kresge Auditorium at MIT, Armin Jordan conducts a Ravel program: *Alborada del gracioso*, *La valse*, *Shéhérazade*, with Florence Quivar, and *Boléro*.
9:00 (WCRB) New York Philharmonic. Zubin Mehta conducts Haydn's Symphony No. 22, Druckman's *Prism*, and the Dvořák Cello Concerto, with Lorne Munroe.

Friday, November 1

12:30 (WBUR) International Society of Contemporary Music. The Composers Quartet performs Schuller's String Quartet No. 1, Cowell's String Quartet No. 4, and Carter's String Quartet No. 1.
2:00 (WGBH) Boston Symphony Orchestra (live). Giuseppe Sinopoli conducts Schumann's *Das Paradies und die Peri*, with Lipovsek, Cole, and Groenroos.

Saturday, November 2

7:00 (WBUR) International Society of Contemporary Music. See the listing for Friday, November 1, at 12:30 p.m.
8:00 (WCRB) and (WGBH) Boston Symphony Orchestra (live). See the listing for Friday, November 1, at 2 p.m.

Sunday, November 3

Noon (WCRB) Carnegie Hall Tonight. "A Folk Celebration." Performers include Gamble Rogers, Odetta, and the McLain Family Band.
3:00 (WCRB) National Symphony Orchestra. Hugh Wolff conducts Brahms's Serenade No. 1, Bruch's Violin Concerto No. 1, with Pinchas Zukerman, and Bartók's *Miraculous Mandarin* Suite.

Wednesday, November 6

9:00 (WBUR) College. Program includes Albert's *Into Eclipse*, Rouse's *Surma Ritornelli*, Selig's *Reflections from a Back View*, and Cohen's Fantasy for Clarinet, Piano, and Bass.

Thursday, November 7

9:00 (WCRB) New York Philharmonic. Klaus Tennstedt conducts Blacher's *Variations on a Theme of Paganini*, Prokofiev's Piano Concerto No. 3, with Alexander Toradze, and Schumann's Symphony No. 3 (*Rhenish*).

Friday, November 8

2:00 (WGBH) Boston Symphony Orchestra (live). Bernard Haitink conducts Mahler's Symphony No. 7 (*Song of the Night*).

Saturday, November 9

9:00 a.m. (WCRB) Philadelphia Orchestra. Wolfgang Sawallisch conducts Smetana's *Má vlast* ("My Fatherland").
7:00 (WBUR) Bach Organ Recital. Roberta Gary performs Bach's Partita Diversa BWV 768, Sonata No. 6 in G major BWV 530, and Fantasy and Fugue in G minor BWV 542.
8:00 (WCRB) and (WGBH) Boston Symphony Orchestra (live). See the listing for Friday, November 8, at 2 p.m.

Sunday, November 10

Noon (WCRB) Carnegie Hall Tonight. Mezzo-soprano Jan DeGaetani, with pianist Gilbert Kalish, performs a program of songs by Tchaikovsky, Davidovsky, Ives, Wernick, and Crumb.
3:00 (WCRB) National Symphony Orchestra. Mstislav Rostropovich conducts the Overture to Kabalevsky's *Colas Breugnon*, the Haydn and Marcello Trumpet Concertos, with Maurice André, and Shostakovich's Symphony No. 1.

Wednesday, November 13

Noon (WBUR) Boston Wind Quintet. The program includes Morley's Five Balletts, Françaix's Quintette, Goodman's Divertimento for Woodwind Quintet, Taffanel's Quintette pour instruments à vent, Mozart's Fantasie in F minor, and Janáček's *Mladi*.

Thursday, November 14

9:00 (WCRB) New York Philharmonic. Zubin Mehta conducts the Scene with Cranes from Sibelius's *Kuolema*, the Sibelius Violin Concerto, with Ida Haendel, Crumb's *A Haunted Landscape*, and Dvořák's *Carnival* Overture.

Friday, November 15

2:00 (WGBH) Boston Symphony Orchestra (live). Bernard Haitink conducts Mozart's Piano Concerto No. 22, with Alicia de Larrocha, and Shostakovich's Symphony No. 8.

Saturday, November 16

9:00 a.m. (WCRB) Philadelphia Orchestra. Riccardo Muti conducts Ginastera's Cello Concerto No. 2, with Aurora Natola-Ginastera, and Handel's *Water Music*.
7:00 (WBUR) Bach Organ Recital. Roberta Gary performs Bach's Prelude and Fugue in A major BWV 536, the Leipzig Chorale Preludes BWV 665 and BWV 666, and the Concerto in D minor BWV 596.
8:00 (WCRB) and (WGBH) Boston Symphony Orchestra (live). See the listing for Friday, November 15, at 2 p.m.

Sunday, November 17

Noon (WCRB) Carnegie Hall Tonight. The Alban Berg Quartet, with pianist Philippe Entremont, perform the Schumann Piano Quintet.
3:00 (WCRB) National Symphony. Myung-Whun Chung conducts Beethoven's Symphony No. 8, Hindemith's Concert Music for Strings and Brass, and Dvořák's Symphony No. 7.
8:00 (WBUR) The Boston Camerata. "The Roots of American Music," led by music director Joel Cohen.

Thursday, November 21

9:00 (WCRB) New York Philharmonic. Zubin Mehta conducts Bach's *Brandenburg Concerto* No. 3, Mozart's Sinfonia Concertante K.297b, and Richard Strauss's *Symphonia domestica*.

Saturday, November 23

9:00 a.m. (WCRB) Philadelphia Orchestra. Rafael Frühbeck de Burgos conducts Arriaga's Symphony in D minor, Rodrigo's *Fantasia para un gentilhombre*, with guitarist Narciso Yepes, and Stravinsky's *Le baiser de la fée*.

Sunday, November 24

Noon (WCRB) Carnegie Hall Tonight. The Berlin Octet performs the Beethoven Septet.
3:00 (WCRB) National Symphony Orchestra. Mstislav Rostropovich conducts Schuman's *Credendum*, the Glazunov and Mendelssohn Violin Concertos, with Anne-Sophie Mutter, and Dukas's *The Sorcerer's Apprentice*.

Thursday, November 28

9:00 (WCRB) New York Philharmonic. Zubin Mehta conducts Stravinsky's *Monumentum pro Gesualdo*, Mozart's Piano Concerto No. 24, with Ken Noda, and Stravinsky's *Le sacre du printemps*.

Friday, November 29

2:00 (WGBH) Boston Symphony Orchestra (live). Seiji Ozawa conducts Penderecki's *Threnody for the Victims of Hiroshima*, Chopin's Piano Concerto No. 2, with Maurizio Pollini, and Dvořák's Symphony No. 7.

Saturday, November 30

9:00 a.m. (WCRB) Philadelphia Orchestra. Dennis Russell Davies conducts act three of Wagner's *Tristan und Isolde* and act two from Glass's *Akhnaten*.
8:00 (WCRB) and (WGBH) Boston Symphony Orchestra (live). See the listing for Friday, November 29, at 2 p.m.

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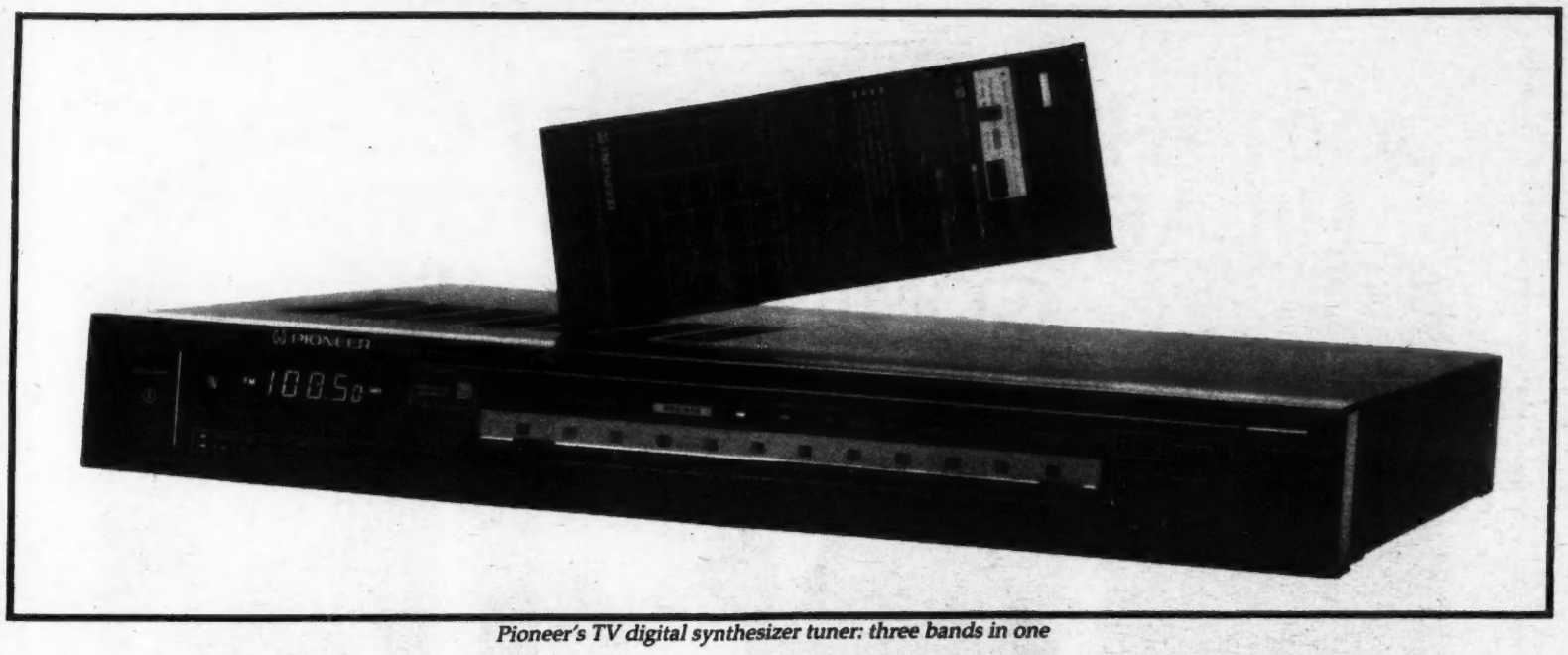


Pioneer's TV digital synthesizer tuner: three bands in one

Circuit shorts

News from the world of electronics

by Peter W. Mitchell

Bulletin

A new Federal Communications Commission rule allows the sale of TV sets capable of tuning to only Channels 3 and 4. Why? Because if you use a cable converter for all your channel tuning, the tuning controls on your VCR and TV set are always set to Channel 3. In theory, at least, the new rule creates the possibility for your next TV set to be made less expensively by omitting all those tuning circuits that you don't use anyway.

Sanyo wanted to do this last year but was blocked by the "all-channel rule," a 20-year-old FCC regulation requiring that every TV set be able to tune to all 12 VHF and 70 UHF channels (this rule was originally passed to promote the growth of UHF TV). Sanyo asked the FCC to waive the all-channel rule, and after a year of deliberation, the FCC recently decided to allow this exception. So far there's been no word as to when the first limited-tuning set will appear on the market.

At present, of course, most TV manufacturers are busily expanding the number of channels that their sets can tune to, to allow convenient tuning of most cable channels without an external converter. A one-channel set that required the use of an outboard cable converter even to receive locally broadcast stations would give new meaning to the term cable ready. Perhaps it should be called cable mandatory.

CES notebook

While Brad Meyer surveyed the general new-product trends at the recent Consumer Electronics show (page 4), I looked into the nooks and crannies of the exhibition hall to spot some noteworthy individual products.

• From 3M comes a neat solution for the most annoying aspect of using video cassettes for time-shifting: the label, which is usually too glossy to write on with a pencil and too firmly adhered to the cassette to be easily removed and replaced. If you reuse a cassette often and identify each recording in ink, there's no choice but to stick a fresh label over the first, and then another, and so on. The 3M company's answer: **Scotch Re-Label tape**, made with the same sort of adhesive as the handy Scotch Post-It notes, which stick where you want but also peel off easily. The white labeling tape is three fourths inch wide and will be ideal for relabeling floppy disks and audio tapes as well as video cassettes.

• Dust has a way of gathering in places where it is hard to reach (between the keys of a computer keyboard) and where it can do the most damage (for example, in the well of a cassette deck, on video-cassette storage shelves, in the loading tray of a CD player, on camera lenses and color slides). The **Mini-Vac** is a little $30 hand-held vacuum cleaner that runs on batteries. If it works as advertised, it will be a neat gift for the audiophile or videophile who has everything. (According to *Consumer Reports*, however, its suction is too weak for it to be really effective.)

• If you don't find it practical to place your TV set between your main stereo speakers, many TV manufacturers (including those who initially made their reputation in hi-fi) will eagerly sell you a pair of small speakers for stereo TV sound. But these don't let you hear the low bass that provides much of the dramatic power of movie and TV soundtracks. Yamaha's clever answer is the **NS-W2** ($225), a subwoofer that contains its own amplifier and is magnetically shielded, so you can use it as a base for the TV set.

• Pioneer has combined AM, FM, and stereo TV into a single three-band digital tuner called **Model TX-V1160** ($330) that has 12 pre-sets on each band. This will come in particularly handy if you're getting stereo TV via an antenna, plus FM simulcasts of pay TV (HBO *et al.*) from cable. The TV portion of the tuner has VHF and UHF (but not cable) tuning, full MTS stereo decoding, and a video output to feed the tuned channel's picture to a video monitor. A wireless remote control costs only $50 extra.

• Do you long for a radio to accompany your singing in the shower? The problem is, any electrical appliance powered by 110-volt AC is potentially fatal when used near water and plumbing — particularly if you're likely to put your hand on its controls while sitting or standing in water. General Electric has a new solution: the **Bathmate**, a $35 AM/FM clock radio that runs on batteries. Its sound isn't high-fidelity, but you won't notice when your ear canals are clogged with soap.

• Another product from GE is a more important technical breakthrough, at least for any videophile who has accumulated a surfeit of wireless remote-control units — one to operate the TV, one for the cable-TV converter, one for the VCR, and another for a laserdisc player. All of today's remote-control systems employ infrared-light beams that are modulated by a digital pulse code; often the code is the only difference between two companies' remote controls. GE's $150 **Control Center** is a wireless remote-control transmitter with a unique "learning" feature. Just place each of your present remote-control transmitters in front of the GE unit (nose to nose), press each button in turn, and the GE controller will memorize the corresponding pulse codes. When you're finished, you can put your various controllers away in a safe place and use just the GE unit to operate everything.

• ADS has a convenient alternative for people willing to buy all their equipment from one manufacturer. Instead of supplying a different remote control with each product, ADS has a single **master remote-control transmitter** for all of its new electronics. And instead of a confusingly large array of buttons, the controller has a slider that changes the code sent by each button to operate a particular device. There are even reserved "pages" in the controller for products that haven't been designed yet, such as a satellite receiver.

• ADS is best known for its loudspeakers. The ADS mini-speakers are consistently superior, but in recent years I haven't been able to recommend the large ADS three-way models because they added a slightly bright and harsh quality to the sound. Recently, ADS acquired a new computerized Fourier-analysis system for measuring in detail the transient behavior of speakers. This revealed a 2kHz resonance in the company's two-inch dome midrange unit, and once the problem was identified, ADS engineers were able to correct it. The new version of the ADS **159C loudspeaker**, which incorporates the redesigned two-inch midrange plus a remarkably smooth three-fourths-inch tweeter, produces splendid sound — brilliantly clear, detailed, transparent, and neutral.

A good idea made better

A few years ago the British company Celestion developed a way to use a laser and a computer to map the back-and-forth motion of woofers and tweeters with submicroscopic precision, revealing the "break-up" modes of ordinary cone and dome materials. What emerged from this analysis was a new formed-copper tweeter that was exceptionally free of resonances within the audible range. Its main drawback was low output, about 10dB lower than most tweeters. Celestion matched it with a woofer of similarly low sensitivity in the SL-6 and SL-600 speakers, which many British reviewers have adopted as reference standards because of their uncolored sound.

But the match wasn't exact: the tweeter was still a couple of dBs lower in level, yielding a somewhat mellow tonal balance, and the speakers were inefficient, requiring a lot of amplifier power. The good news, as we learned during a recent visit to the Celestion factory, is that the company has now developed an aluminum clone of the copper tweeter that shares the latter's virtues but is less expensive to make and 10dB more efficient. The result, the new Celestion DL-8 speaker, costs $500 a pair (half as much as the SL-6), works well with a 20-watt amplifier, and has an impressively neutral, accurate response. — □

Stereophonic television

With local channels 2, 4, and 66 already broadcasting stereo TV and other stations preparing for stereo, one of the main incentives to buy a new VCR or TV set is to gain the ability to receive those transmissions. But if you are a cable subscriber, the stereo-receiving circuits in your new TV or VCR may not do you much good.

The TV industry's Multichannel Television Sound (MTS) Committee spent five years evaluating technical proposals for broadcasting TV sound in stereo, but its deliberations failed to discover one major problem: most existing cable-TV systems cannot pass the MTS stereo portion of the signal unimpaired. Back when the testing began, this didn't matter; only 10 percent of homes were wired for cable. But the number now exceeds 40 percent, and before long fully half of America's TV viewers will be getting their signals via cable rather than directly from an antenna. Many of those viewers won't be able to obtain clean stereo sound.

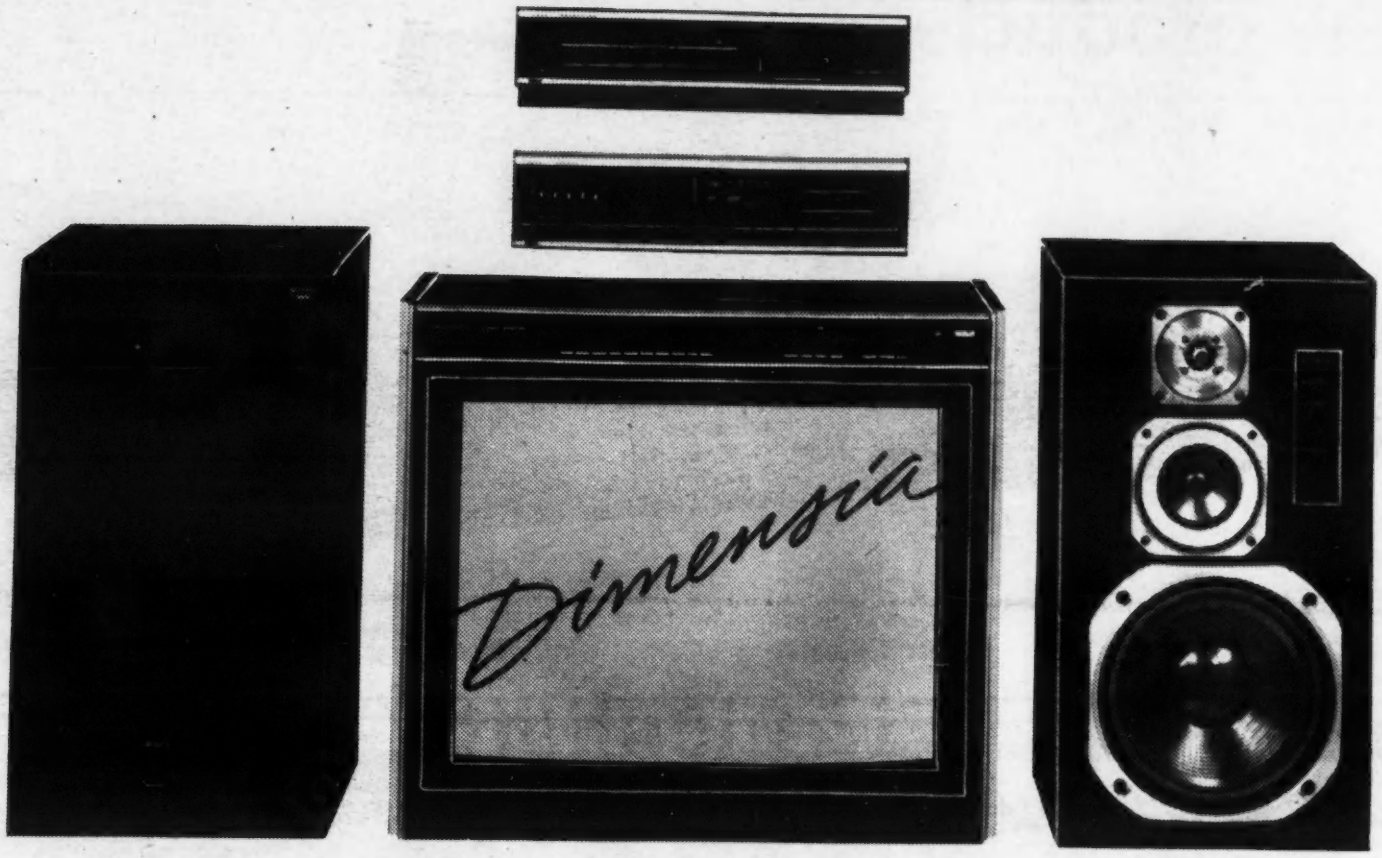
The immediate reaction is confusion. If you're buying a new TV or VCR, should you spend more to get one with MTS stereo decoding? If cable service is unavailable where you are, go ahead. But if you are a cable subscriber or might become one, there's no easy answer. Ultimately it will depend on what the nation's cable operators do. If they were to provide all their subscribers with new set-top converters that could pass MTS stereo signals through to the TV set unimpaired, we would want stereo-ready TV sets. But most cable-system operators are in no hurry to undertake that expense (even though they would eventually make the money back in higher monthly fees).

Group W, a Westinghouse subsidiary that runs about a dozen cable systems around the country and has 1.5 million subscribers, has decided to try a simple solution: FM simulcasting. The MTS stereo subcarrier will be stripped off the broadcast signal and converted to an unused FM frequency.

Many cable operators, including Warner/Amex in Medford and Somerville, already simulcast the stereo sound of MTV, HBO, and the Movie Channel, so it would be easy to use FM for the new stereo-TV broadcasts as well. If these cable operators follow Group W's lead, there will be no need for subscribers to invest in new MTS decoding equipment. All you'll need is a five-dollar splitter to send part of the cable signal to your FM stereo tuner or receiver. Of course, whenever you switch TV channels you'll have to retune the FM as well. To avoid this inconvenience, there will be optional remote-control set-top cable converters with built-in FM tuning that is switched simultaneously with the TV channel.

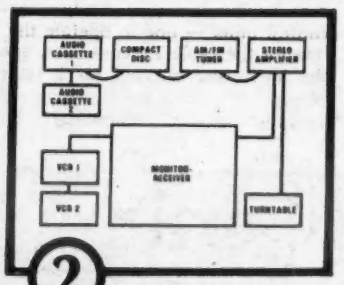
Local cable operators haven't yet announced what they plan to do about TV stereo. They may not commit themselves to a solution soon, and they may not need to, for the TV networks are being rather slow to convert their programming to stereo. So far only PBS and NBC are making any substantial effort to produce TV programs with stereo sound; ABC and especially CBS are dragging their heels. Stay tuned.

— P.W.M.

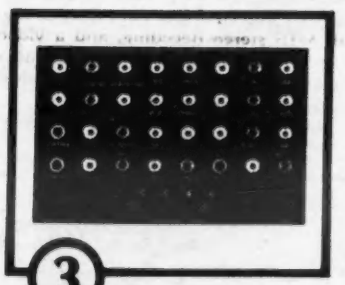


Why DIMENSIA is the world's most advanced audio/video system.

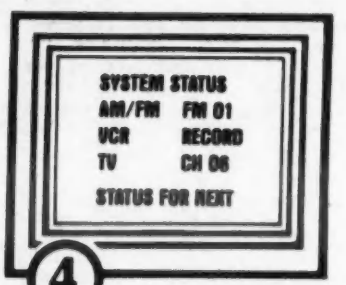
1 **Dimensia Command Center** provides direct push-button control of Dimensia components from your easy chair. Included with Monitor-Receiver which acts as system's central switching intelligence.



2 **SystemLink** is Dimensia's unique interconnect system. Allows you to connect most components in "daisy chain" fashion as shown above instead of running all connections to amplifier.



3 **Rear Jack Panel** on Monitor features input/output jacks which link all compatible devices. You can access several audio/video devices remotely, and Monitor's "intelligence" will do the rest.



4 **On-Screen Displays** make operation easy. These color-coded displays enable you to check the status of any system component and even prompt you when further instructions are needed.

Get started with the Dimensia System shown above.

26" diagonal Monitor-Receiver
RCA's exclusive Full Spectrum chassis processes 100% of the audio/video signal including stereo TV. Interacts with other components to give you complete system control. Choice of oak or ebony finish. (DVM2600/2601.)

VHS Hi-Fi Stereo VCR
Superb performance from five video heads, two audio heads, with stereo sound that approaches compact digital disc quality. Remote programming with on-screen cues. Jitter-free special effects. (VKT700.)

AM/FM Stereo Receiver
50 watts per channel (RMS minimum rating, into 8 ohm loads, at 20-20,000 Hz, with no more than 0.05% THD). Memory for up to 16 pre-set stations. Graphic equalizer with 5 bands. (MSR150.)

3-Way Speaker System
11" polypropylene cone woofers, 4" polypropylene midrange, 1" cloth dome tweeters. Air suspension design. Frequency range: 35-20,000 Hz. Choice of oak or ebony finish. (SPK375.)

SPECIAL "STARTER SYSTEM"

Other Dimensia components available include:

- DVM4000/4001 40" Projection Monitor
- MVR975HF Convertible VHS Hi-Fi VCR
- MSA200 100-Watt Integrated Amplifier
- MSA100 50-Watt Integrated Amplifier
- MAT110 AM/FM Tuner
- MGE160 Graphic Equalizer
- MTR120 Auto-Reverse Cassette Deck
- MCD140 Compact Disc Player
- MTT130 Top-Loading Turntable
- MTT135 Front-Loading Turntable

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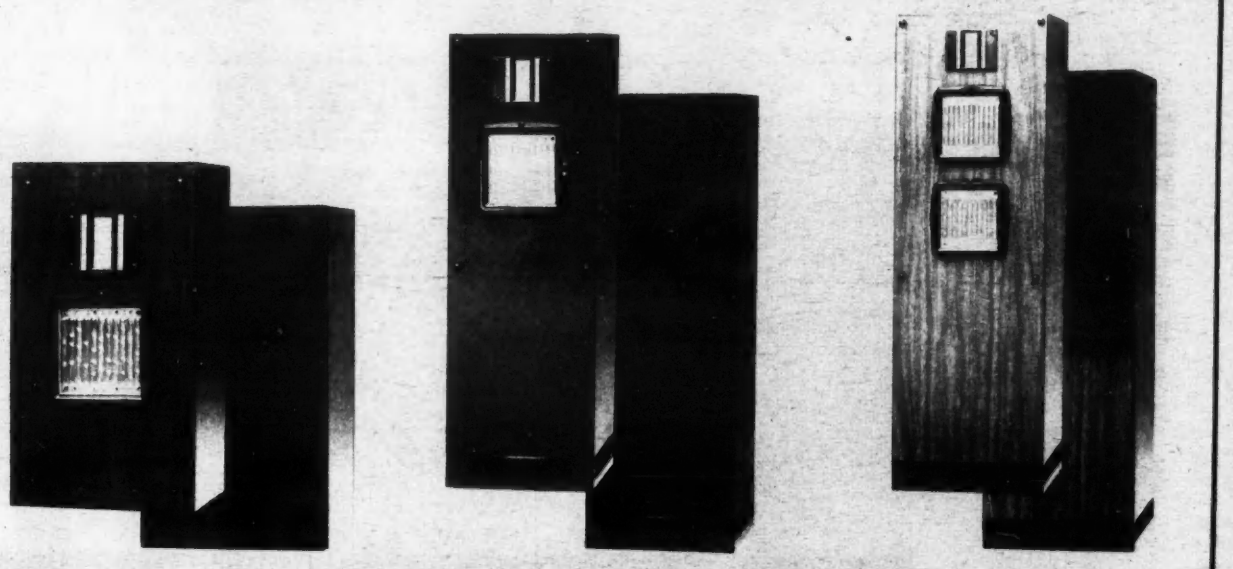
New products

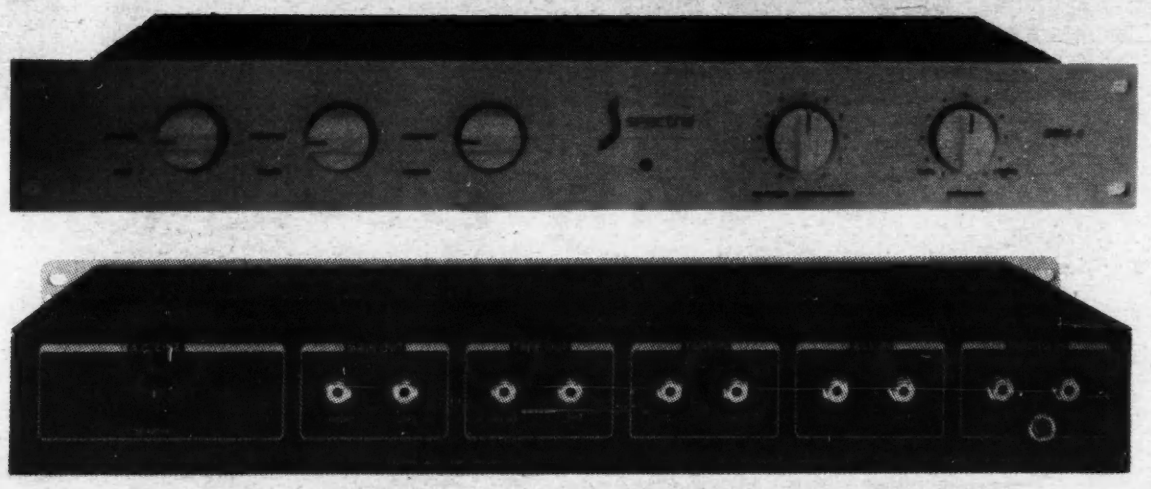
Sawafuji speakers

Just out from Sawafuji America is the Dynawave speaker series. The top-of-the-line Tower II features high-energy strontium-bar magnets and a heat-resistant voice-coil polymer diaphragm for even sound emission across the surface of the patented Dynapleats driver. "Flat-wave" ribbon tweeters provide high definition in the upper ranges, and the company claims to have achieved natural sound reproduction with a minimum of bias. The speaker promises a rated impedance of 8 Ohms and an input of 20 watts/max 150 watts, with a frequency response of 34Hz to 18kHz. Available in black matte or walnut finish, the Tower II takes up only one square foot of floor space and measures 38 inches high. The Tower II retails for $600 per pair.



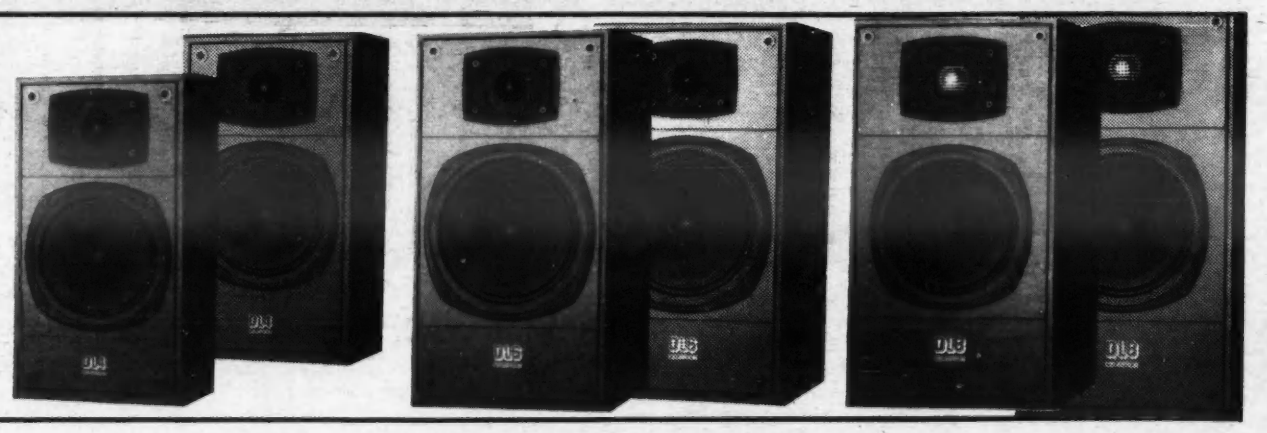
Spectral preamp

Spectral Audio Associates of Mountain View, California, has introduced the Spectral DMC-5 preamplifier. The DMC-5 features Spectral's own MOSFET technology, enough gain to accommodate moving-coil cartridges without a third gain stage, and the ability to select cartridge loading using DIP switches. Spectral claims that the preamp boasts distortion and RIAA-standard accuracy that reach the limits of measurability, with metal film resistors, capacitors of custom polystyrene and polypropylene, and gold-plated phono sockets. The DMC-5's precision volume control features .1dB tracking. The unit is priced at $1495.



Celestion speakers

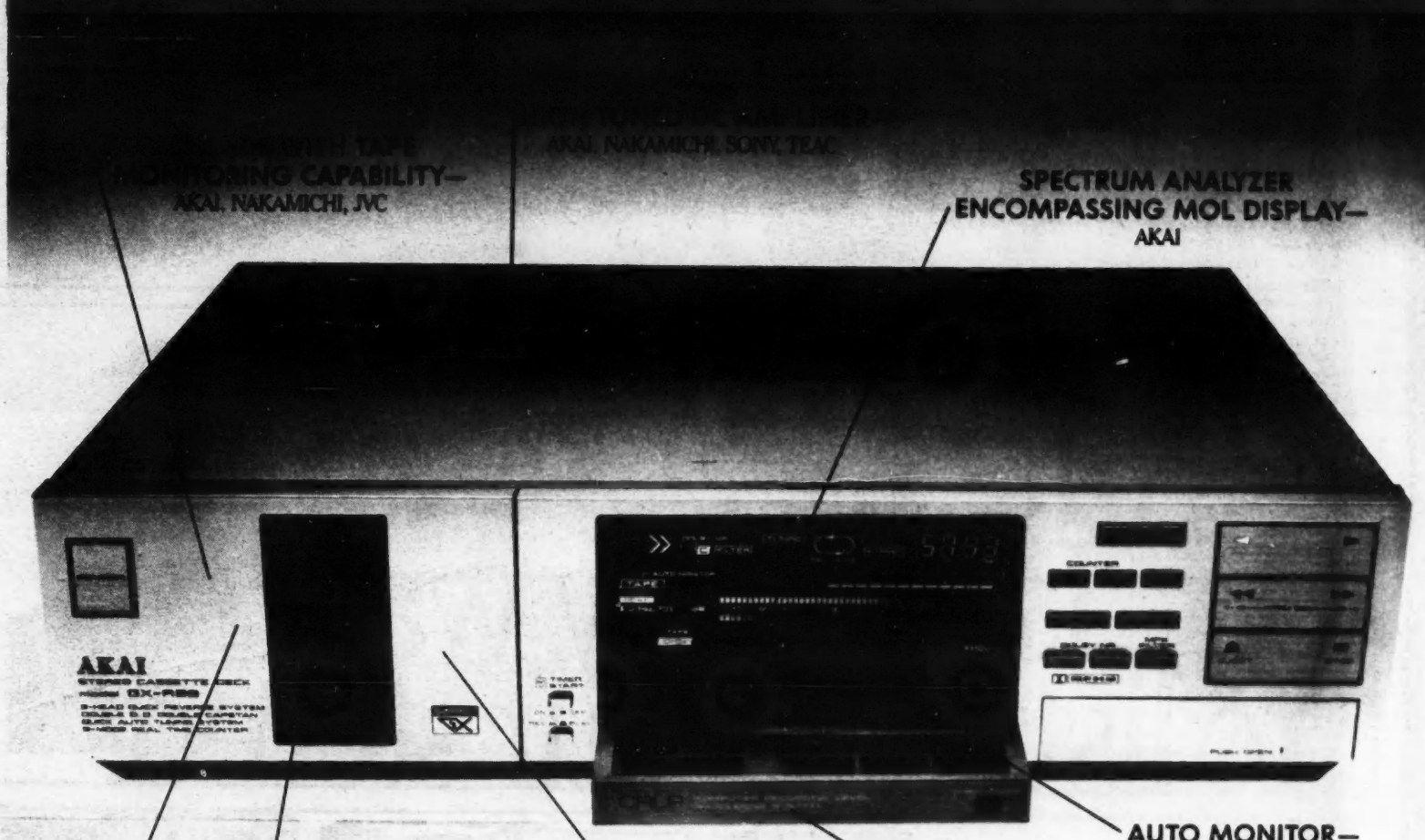
Having long made speakers for concert performers, Celestion now introduces its DL series for home use. Using laser interferometry to observe and measure the vibrating diaphragm, Celestion has designed a speaker line that is fully compatible with digital compact-disc systems. The DL4 is the line's 75-watt model, with a sensitivity of 89dB/1 watt/70Hz to 20kHz and crossover of 2.5kHz. The cabinet is a ported bass-reflex design finished in black or walnut. The DL4 is priced at $300 per pair.



SOTA turntable

In an attempt to minimize the "sonic signature" of most turntables, SOTA Industries of Berkeley, California, introduces the SOTA Sapphire, a belt-drive turntable with dynamic stability. Its four-point subassembly system packs more than 20 pounds of lead and other low-resonance rigid material to distribute inertial forces. Each single-piece SOTA platter is individually balanced and fitted for the bearing it uses in order to minimize random alignment irregularities. The distribution of 40 percent of the table's mass along its rim lessens error caused by machining tolerances. Each bearing is set atop a stable thrust shaft to decrease the wobble prevalent in systems where the shaft rotates above the bearing. The disc between the bearing and the platter is made of sapphire, making it stronger than and less prone to friction than steel discs. The turntable features a suspension frequency of 2.55 Hz; rumble is less than −60dB unweighted, and wow and flutter are below .04 percent. Better not walk it home, though — the SOTA Sapphire weighs in at 44 pounds. It retails for $850.

YOU'RE LOOKING AT THE SIX BEST AUTO-REVERSING DECKS YOU CAN BUY.

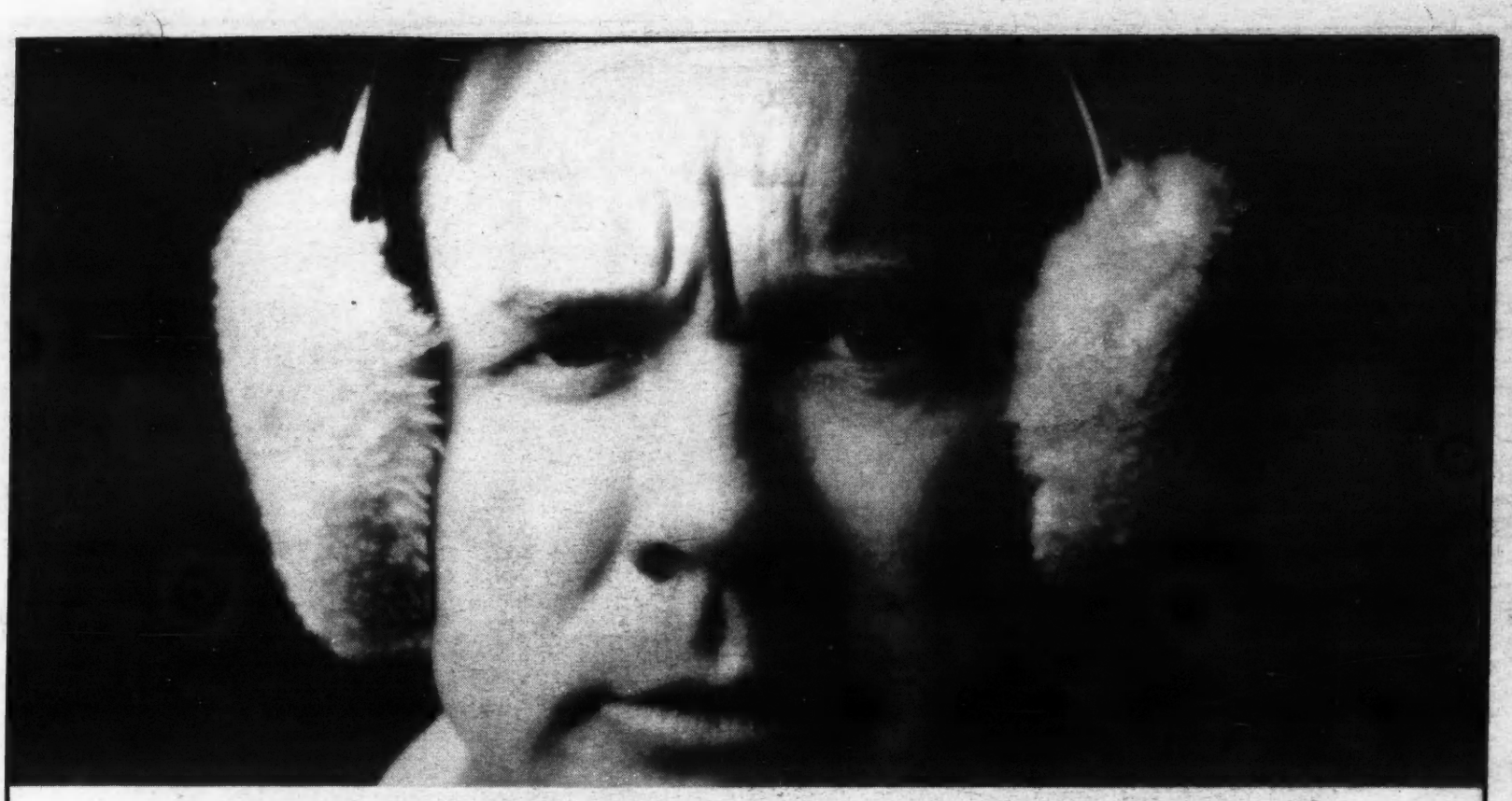


Staying ahead of the competition in auto-reversing cassette decks has been an AKAI tradition for the past 14 years. Now we're introducing the all-new GX-R99, a deck that has so many advanced features you'd have to buy six other auto-reversing decks to get them all.

Features like our Computer Record Level Processing System, that sets a tape's bias, equalization and tape sensitivity, measures a tape's MOL, then sets the optimum recording level. A Spectrum Analyzer encompassing MOL display, which displays frequency response with greater accuracy. AKAI's exclusive Auto Monitor. And our super GX heads. So super, they're guaranteed for 17½ years of continuous play.

It's easy to see why the GX-R99, just one of four great AKAI auto-reversing decks, is called the Dragon Slayer. And to find out why it's getting more praise than all the other guys combined, write to AKAI, P.O. Box 6010, Dept. C9, Compton, CA 90224.

AKAI
Hi-Fi & Video



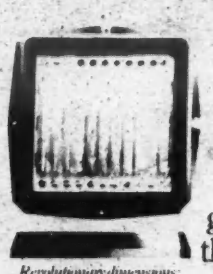
Is this any way to listen to your stereo?

If you listen to an ordinary stereo, you're not hearing very well. Because most speakers distort the original sound. The reproduction you get is uneven and inaccurate. So you might as well be wearing earmuffs.

The reason why is that the average speaker depends on a conventional cone driver. Now cones may be great for ice cream, but they don't give you the true flavor of great music.

You see, sound waves are distorted by the cone's shape and come to you unevenly. In fact, they're usually biased toward the low-end of the scale.

So what you really hear is the cone's interpretation of the original. Prince's cone, for instance, instead of Prince. Or Rubinstein's version of the "Moonlight Sonata" as interpreted by the cone.



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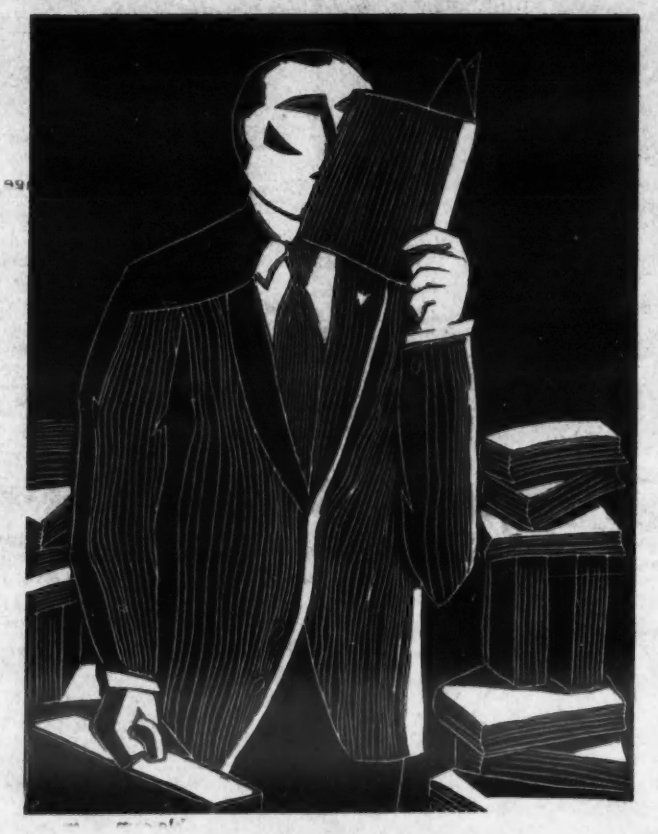

PEN AND INC.

Howard Litwak on the latest in corporate 'excellence'

James Hunter on the wit and wisdom of *Iacocca*

POISON PEN

Henry Sheehan on Patricia Highsmith's Ripley saga

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ILLUSTRATIONS BY BOB PRIEST

INNOVATION AND ENTREPRENEURSHIP: PRACTICE AND PRINCIPLES, by Peter F. Drucker. Harper & Row, 277 pages, $19.95.

A PASSION FOR EXCELLENCE: THE LEADERSHIP DIFFERENCE, by Tom Peters and Nancy Austin. Random House, 437 pages, $19.95.

Just managing

The latest searches for excellence in business

by Howard Litwak

BOB PRIEST

As if New Coke didn't have enough problems, a note in a recent *New York Times* provided new evidence of the extent of the miscalculation it represents. It seems that federal regulations forbid the use of the word new in a product name for more than six months. So New Coke will soon be just plain Coke, and the real thing will keep the moniker Classic. The decision makers down in Atlanta clearly anticipated that after a six-month breaking-in period, the new stuff would have completely supplanted authentic Coke, leaving not a trace — a bit of revisionism that's almost Orwellian in conception. So grandiose a scheme deserved so ignominious a failure, and indeed New Coke is well on its way to enshrinement as the Edsel of our time.

And just how big a bust was the Edsel? In his new book, Peter Drucker reports on the legendary '50s fiasco:

> *Very few products were ever more carefully designed, more carefully introduced, more skillfully marketed. The Edsel was intended to be the final step in the most thoroughly planned strategy in American business history: a ten-year campaign during which the Ford Motor Company converted itself after World War II from near-bankruptcy into an aggressive competitor, a strong number two in the United States. . . . Ford went to extreme lengths to plan and design the Edsel, embodying in its design the best information from market research, the best information about customer preferences in appearance and styling, and the highest standards of quality control. Yet the Edsel became a total failure right away.*

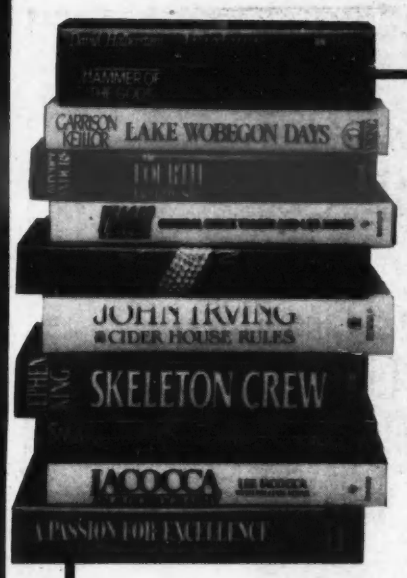
Sound familiar? It ought to — and not just because of Coke's comic opera. A few moments of reflection produces dozens of other examples of massively *wrong* decisions by apparently rational business people. (By wrong, incidentally, I don't mean ethically shallow or socially reprehensible or illegal — I mean bad in business terms.) Whether it's overfunding *Heaven's Gate* or overpaying mediocre baseball players, oversupplying personal computers or oversizing automobiles, this kind (if not scale) of business error happens all the time. Drucker cites any number of mistakes, including a personal favorite — the occasion in the mid '50s when he was called in as a consultant by Macy's because " 'We don't know how to stop the growth of appliance sales.' 'Why do you want to stop them?', I asked, quite mystified. . . . The chairman [responded], 'In this kind of store, it is normal and healthy for fashion to produce seventy percent of sales. Appliance sales have grown so fast that they now account for three-fifths. And that's abnormal. . . . The only thing left now is to push appliance sales down to where they should be.' "

What accounts for such misdirected thinking? Drucker has produced a volume full of examples of it (leavening them with infrequent instances of success), and his comment is: "These examples are likely to be considered obvious. . . . But the father of systematic economics, David Ricardo, is believed to have said once, 'Profits are not made by differential cleverness, but by differential stupidity.' . . . Most suppliers — of goods as well as of services, businesses as well as public-service institutions — do not think." And as for why this should be so, Drucker — 46 years after publishing his first volume on how business works — can only conclude, "I cannot explain."

Notions of innovation and entrepreneurship are essential to any coherent theory of the social value of capitalism (not to mention basic to the public personas of businesspeople), and the perception that they are in woefully short supply in most enterprises is at the core of much of the recent anguished thought about the shortcomings of American business. Drucker, who helped invent the concepts of modern management and strategic planning, is as thoughtful and intellectually wide-ranging an analyst of business practices as any in the debate today. The new volume is crisply written, closely reasoned, and (somewhat surprisingly) a page turner, even if his observations amount to little more than informed common sense, a kind of literate "Keep it simple, stupid" approach. His basic purpose is to demolish the myth of the "flash of genius" entrepreneur, as mythical a creature as the starving artist who suddenly finds inspiration. Hard, directed work, says Drucker, is the only approach to innovation and entrepreneurship.

He approvingly describes, for example, Ford's response to the failure of the Edsel: a complete reassessment of what the public of the late 1950s was looking for in a car. For the Edsel was not a mechanical failure. It was a car without a market, despite all the best market research then available. It took a reconsideration of the psychology of auto buying for Ford to discover the emergence of a new kind of market altogether — a sporty, "lifestyle-oriented" (to borrow a term that was invented more than a decade later) purchasing public. The result? The marketing of the Thunderbird, which achieved the success for which the Edsel had been designed. And then the success of the Mustang, the Lee Iacocca-inspired breakthrough of style.

A similar discovery awaited the one major New York retailer bold enough to capitalize on the appliance-sale



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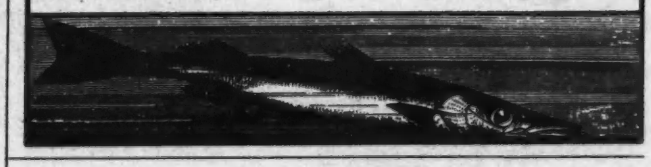

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revolution that so discombobulated Macy's. Bloomingdale's, at best the number four department store in New York in the '50s, "realized that something was happening and analyzed it. It then built a new position in the marketplace around its Housewares Department. It also refocused its fashion and apparel sales to reach a new customer: the customer of whose emergence the explosion in appliance sales was only a symptom."

Through examples like these, Drucker pinpoints seven sources of innovation (ranging from new knowledge to demographic shifts) and five forms of entrepreneurial practice (ranging from recognizing opportunities, as Bloomingdale's did, to developing an entrepreneurial spirit throughout the company). Drucker — who was born in Vienna and educated in England, and who received a doctorate in public and international law in Germany before moving to the United States — is an urbane guide to the varieties of entrepreneurial practice. He is particularly trenchant on the possibilities for and importance of innovation in public and institutional settings, and reserves some of his most laudatory comments for work in universities and by the Girl Scouts. Only once does the elegant manner slip: in Drucker's denunciation of the young pups, straight out of management school and lacking all real experience, who try to counsel a company on the basis of computer analysis. Computer printouts, like financial reports, are to Drucker mere tools; it still takes a human hand to employ them in the service of an idea.

* * *

Clear evidence of the concern over business's shortcomings is the continued presence in the airport book racks of the name Tom Peters. Four years ago, in collaboration with a management-consultant partner, Peters produced *In Search of Excellence*, which blazed trails for general-readership business books and is still on the paperback bestseller list. Peters has since hooked up with Nancy Austin, a former management-development specialist at Hewlett-Packard, in a variety of consulting ventures, the intellectual results of which have now appeared as *A Passion for Excellence*. The progression from "search" to "passion" is indicative of the new volume's breathless, evangelical prose; but Peters and Austin do have their eye on the target — the creation of an entrepreneurial spirit within a business enterprise. Whereas Drucker is polished and highly analytical, Peters and Austin tend to the anecdotal. Still, they offer the same basic insights, applaud the same companies (3M, Johnson & Johnson), even supply similar examples (Drucker tells the story of 3M's development of Scotch tape; Peters and Austin the tale of the same company's invention of those invaluable little gummed slips for annotating documents — both of which represent accidental opportunities that were seized upon by vigilant, entrepreneurially minded management). Peters and Austin's yarns about the crusty leaders who stir the pot are sometimes wearying, and sometimes suggest a certain imbalance in those leaders (imagine, Frank Perdue really does spend all his time yammering about better chickens!). But their consultant's-eye view of the everyday rigidities and cover-your-ass torpor of corporate culture is dead on.

And their solutions? "First, take exceptional care of your customers (for chicken, jet engines, health care, or baseball) via superior service and superior quality. Second, constantly innovate. That's it." Sound obvious? Well, it does to Peters and Austin, too; in fact, their introductory chapter is called "A Blinding Flash of the Obvious." Yet, as they go on to note, "We've often said, only half facetiously, that IBM's only magic is that IBM's people are the lone players in a quarter-trillion-dollar industry who bother to answer the phones consistently. That Disney seems to be the sole player in its big industry that has figured out how to keep a theme park sparkling clean. It turns out that the obvious is not so obvious — and it's a hell of a lot harder to do than we ever imagined!" Hard enough, apparently, so that Peters and Austin can produce chapter after chapter to document the ways in which executives pay lip service to the principles of "excellence" and no heed at all to the practice. Each chapter also contains counter-examples and, more important, a checklist of "some questions and things to do now." Of course, if the inertia of most corporations is what Peters and Austin (and Drucker) say it is, those things are not going to be easy to do. As they remark in defining "now," "If you don't get started in the next seventy-two hours, you ain't going to get started at all."

Take one of their simplest concepts, MBWA (for "managing by wandering around"). Couldn't be more common-sensical: if you want to know what's going on in your department or your company or with your customers, get out there and ask. It's pretty shocking that so simple a procedure is so frequently overlooked that Peters and Austin needed to coin an acronym for it. At least they aren't naïve about the difficulties in implementing it. After all, most bosses are so remote from shop-floor realities — and alienation is high on the list of realities — that their first (or first 100) hikes around are likely to be of little value. Nonetheless, MBWA represents an essential mindset, a feeling for more humane ways to organize business — and its absence, like so many other absences documented by Peters and Austin and Drucker, is symptomatic of the larger problem.

When it comes to that larger problem, we should be clear in definition. It's not capitalism as such, not in these volumes. If you're looking for the deeper analysis of why you and your coworkers hate your jobs, why you feel robbed of your labor, and why buying things makes you feel better, don't read *A Passion for Excellence* or

Continued on page 4

Boss seller

by James Hunter

IACOCCA: AN AUTOBIOGRAPHY, by Lee Iacocca with William Novak. Bantam Books, 352 pages, $19.95.

The largest-selling adult hard cover since *Jonathan Livingston Seagull*, which was about a bird, is about the life and times of Lee Iacocca, the father of the Mustang and the Chrysler Corporation's savior on the TV spot. Eleven months after its publication, almost 2.2 million copies of this good-natured, petty, interesting, and cornball text are in print, a fact the *New York Times* calls "a milestone." *Fortune* calls Iacocca "the most famous and most popular American businessman." And the *Wall Street Journal* has gauged his ego to be "as big as all outdoors" — though since the paper's "Let Them Die with Dignity" editorials during the Chrysler-loan-guarantee controversy, Iacocca's not much of a *Journal* man anyway.

When he was an engineering student at Lehigh University, in the mid '40s, Iacocca was already crazy about cars. He drove a beat-up old 1938 60-horsepower Ford whose transmission often conked out going up the campus hills. "Some faceless executive," he gripes, "had apparently decided they'd get better fuel economy by taking a V-8 engine down to only sixty horsepower." "Those guys need me," he joked to his friends. "Anybody who builds a car this bad can use some help." His eye was caught by a Mark I ("one of those snazzy Lincoln Continentals") driven by the local Ford recruiter. Seems like your everyday mid-American car buff, analyzing gearboxes and noticing grills, in those long-ago days before BMWs, when Fords and Chevys still had some sex appeal.

Iacocca probably wouldn't have been written absent the Chrysler soap opera; even with it, it's hard to imagine the book selling as phenomenally as it has without Iacocca's TV appearances — 16 different commercials that aired between 1980 and 1984. "Am I famous for the Mustang?" Iacocca wonders. "For guiding Ford through the most profitable years in its history? For having turned around Chrysler? It's a hell of a note, but I have a feeling I'm going to be remembered only for my TV commercials." And why not? Like his other successes, they were triumphs of styling over substance. But now Iacocca will be remembered for *Iacocca*, which for the most part is

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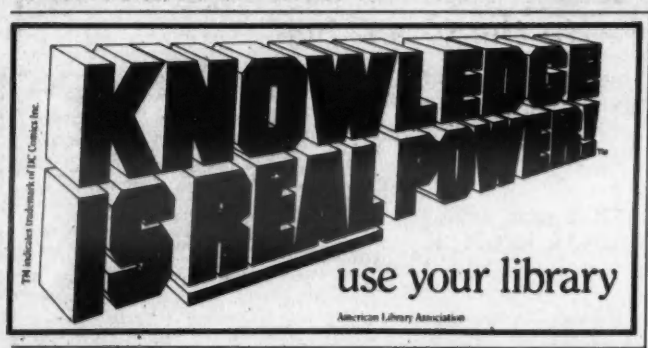

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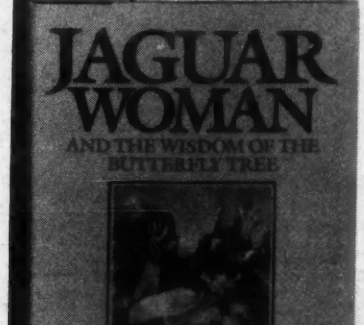

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Business

Continued from page 3

Innovation and Entreprenuership. The books you're looking for are by Marx and Engels and Weber. Drucker and Peters and Austin are writing for readers who come home at night and complain that things could be much better if only the boss would pay attention, or dream that "If I ran the place, there wouldn't be any of this Mickey Mouse."

Many years ago, Kurt Vonnegut wrote an essay to the effect that all the people who were the popular "leaders" in high school grew up to run everything in the country. I am, at last, of an age where I can truly dread that result: most of the BMOCs in my high school don't think any better now than they did then, and business is simply another arena for their mistakes. Who among us couldn't fill in names for the leader/nonleader dichotomy Peters and Austin set up in their checklist? ("Leader: carries water for people. Fair. Humble. Tough — confronts nasty problems. Tolerant of open disagreement. Trusts people.... Non-leader: presides over the mess. Fair to the top; exploits the rest. Arrogant. Elusive — the artful dodger. Intolerant of open disagreement. Trusts only words and numbers on paper....") I've said it about my bosses; you've said it about yours; somebody will say it about you and me if we become bosses. Down in Atlanta, they probably say it about the jerk who signed off on New Coke. Drucker, Peters, and Austin are all friends of capitalism — friends who worry because the captains of industry (and the lieutenants, for that matter) are so good at overlooking the obvious ways to run it better. That's what explains these friends' air of concern: from where they sit, it looks as though New Coke happens all the time. □

Iacocca

Continued from page 3

one of his commercials stretched into a pop-literary form. The book has a remarkably consistent folk-corporate voice, and it's recognizably the voice of those ads: if you can find an autobiography by someone who seems like a nicer guy, it seems to say, a fairer boss, more of a no-nonsense thinker or a marketing ace, buy it. Which doesn't mean this is the book to consult for a thorough account of the bureaucratic intricacies of the $1.5 billion federally insured loan Chrysler eventually received, or of the mind-boggling financial arrangements that had to be ironed out once Congress approved the loan legislation. Not from an author who describes a closing this way: "Normally, a closing consists of a bunch of lawyers who get together, look over some documents, and declare that the deal is complete."

(Now, that's impressive (as Iacocca would put it), the way it explains a not uncomplicated legal procedure as though it were a matter of a PTA group choosing a vending machine. That's what mass-success items often do: render complex, specialized, or esoteric material more accessible. Apart from the obvious populist implications, this isn't always bad, because sometimes in the translation from "difficult" to "easy" something bold or resonant or just plain likable in its own right is arrived at.

The best patches of *Iacocca* work in this way, but not Iacocca on the Chrysler loans. Here the book can't get out of its own point of view, not even for a contextualizing moment. You don't expect objectivity from the CEO of the company in question, but you do expect him not to write, "Loan guarantees, I soon learned, were as American as apple pie," and then list federal assistance to students in the same round-up of evidence with the Lockheed Corporation. And you do expect him not *still* to be selling to Congress. After the Treasury Department had figured that a Chrysler collapse would have necessitated $2.7 billion in unemployment and welfare payments, Iacocca said to Washington, " 'You guys have a choice. Do you want to pay the $2.7 billion now, or do you want to guarantee loans of half that amount with a good chance of getting it all back?' " "You can pay now or you can pay later" is pretty swift rhetoric, but it conveniently ignores the possibility that if Chrysler had in fact gone under, the government would have been out $4.2 billion (minus what it could have gotten at auction for a few outmoded assembly lines).

Iacocca's better telling Mustang stories. On the design: "We wanted to develop a car that you could drive to the country club on Friday night, to the drag strip on Saturday, and to church on Sunday." On the first Mustang print ads: "We used what I call the Mona Lisa approach: a simple profile of the car in white, listing the price along with a simple line, 'The Unexpected.' " And on the model's decline: "Within a few years of its introduction, The Mustang was no longer a sleek horse. It was more like a fat pig." Iacocca's chapter on how he kicked a little class into the formerly sales- and image-poor Lincoln-Mercury Division in the early '70s — by hiring a live animal to promote the Cougar, for example, or a Dutch diamond-cutter to work in the backseat of a moving Mercury Marquis — is also good reading. In "The Key to Management" he recommends Dale Carnegie courses in public speaking to the shy. And he modestly praises his own quarterly-review system of management. "You always need committees," he knows, but Iacocca's approach to business in action is more like his approach to duck hunting. "You aim at a duck and get it in your sights, but the duck is always moving. *In order to hit the duck, you have to move your gun.* But a committee faced with a major decision can't always move as quickly as the events it's trying to respond to. By the time the committee is ready to shoot, the duck has flown away." Unlike his closing while-I-have-your-attention talks on seatbelts — Iacocca's windy selling seatbelts — and on air bags, the clever Japanese, and the Statue of Liberty, these parts of *Iacocca* click.

The book, finally, is a "celebrity autobiography" mostly in form, not substance. Iacocca mentions his daughters here and there, and his late wife, but it's interesting that he finishes off his pre-Ford life in just 28 pages. Shedding light on corporate institutions and shake-ups not usually written about with this much candor — or this much casualness — *Iacocca* is really closer to *The Brethren*, say. The difference is that the material isn't treated by a couple of cool young reporters, but by a garrulous old guy who dreamed up his own snazzy car and sold it like hotcakes, and who later "saved" an auto company he'd always regarded as nerdy. At one point, Iacocca needs to think of something esoteric, really far-out — and comes up with "such as Zen Buddhism." With that sort of voice, it's not hard to figure the book's appeal for millions of readers big on family, professional achievement, success, and money. And at any rate, *Iacocca* has it all over *Jonathan Livingston Seagull*. More down to earth.

THE MYSTERIOUS MR. RIPLEY, by Patricia Highsmith (includes THE TALENTED MR. RIPLEY, RIPLEY UNDER GROUND, and RIPLEY'S GAME). Penguin, 648 pages, $9.95 paper.

THE BOY WHO FOLLOWED RIPLEY, by Patricia Highsmith. Penguin, 336 pages, $3.95 paper.

The return of Ripley

Highsmith's unlikely hero

by Henry Sheehan

BOB PRIEST

Would you kill to attain the good life? I mean the truly good life, a life of cultured leisure — definitely not the gaudy getting-by of a middle-class mafioso who murders for hire. And we're talking about the necessary death, the unavoidable killing, the elimination of philistine impediments. Well, that's what Thomas Ripley — originally of Boston, currently of Villeperce, France — did. Many times, in fact. If people would just let him, Ripley would spend his life in his quiet study of languages, painting, and the harpsichord on his modest estate with his beautiful French wife, Héloise. If people would just let him.

Mr. Ripley is the creation of Patricia Highsmith, who like her most enduring character is an American who has chosen to spend most of her adult life in Europe. A prolific writer of thrillers, Highsmith originally presented Ripley in *The Talented Mr. Ripley*, in 1955. It was only her third novel, and it won her the Mystery Writers of America Edgar Allan Poe Scroll for best mystery of the year. But "mystery" is a somewhat misleading label for Highsmith's work. Perhaps a more pointed compliment was paid her by Alfred Hitchcock, who adapted her first novel, *Strangers on a Train*, into one of his screen masterpieces. Highsmith and Hitchcock are both tracking the same game: guilt. But whereas Hitchcock is trying to ascertain the measure of guilt borne by every soul, everyone's assumption of original sin, Highsmith has no hesitation in assigning criminal responsibilities. In Highsmith's gallery of heroes and antiheroes, all are smeared with the same marks of Cain. The only question is, how are they going to handle it?

In *Strangers*, Guy Haines, the young architect who meets the hate-filled Charles Bruno (Bruno Anthony in the movie) on a hurtling train, doesn't handle it well at all. After the original meeting between the two young men, when their murderous fate is sealed, the book and movie diverge sharply. Like the movie, the book presents the two as doppelgängers with an undertone of sexual attraction. But Highsmith's portrait of the pair is much darker, with less emphasis on action than on the demonic control that Bruno inexorably comes to exercise over Guy. Highsmith's *Strangers* becomes an examination of psychological slavery whose intensity pushes it over into something metaphysical. In fact, things become so unnerving that the book's occasional forays into conventional detective fiction come as marked relief from Highsmith's delineation of Guy's moral, mental, and emotional unraveling.

A remarkable enough début, *Strangers on a Train* is marred by a young writer's obvious attempts to write a contemporary *Crime and Punishment*, with a well-executed but unoriginal dénouement. However, for all the psychological torture in her book, Highsmith never fell into overwrought prose; by the time she wrote *The Talented Mr. Ripley*, she had refined her style even more, so that the book's maelstrom of emotions are rendered in perfectly straightforward writing. Tom Ripley is introduced to us ducking from bar to bar along New York's Fifth Avenue, trying to ascertain whether he's being followed by postal authorities, the FBI, or someone else with the authority to bust him for a little scam he's been running. As it turns out, he is being followed by a wealthy businessman, the father of an old acquaintance, Dickie Greenleaf, who's gone to Europe to paint and won't come back to take over the family shipyard. Would Tom be interested in going to Europe at Mr. Greenleaf's expense to try to talk Dickie into returning? Without even an apartment to leave behind, Tom naturally accepts — even though he's not quite sure he remembers Dickie all that clearly.

Highsmith is able to introduce some immediate anxiety into her exposition, but it's once she gets Tom to the sleepy Italian fishing village of Mongibello — where he finds Dickie and an American girl who may or may not be Dickie's lover — that the paranoia goes into high gear. The first third of *The Talented Mr. Ripley* may be the most unsettling account of emotional insecurity in print. Tom is presented to us as frankly (for the '50s) gay, though he is anything but frank about it to Dickie or the girl, Marge. Writing in the third person, Highsmith stays firmly implanted in Tom's psyche as he quickly begins to crave not just Dickie, but the style of life he could have with Dickie's income. Trying to separate his own jealousies and fears from what he imagines are the real feelings of Dickie and Marge, Tom feels the emotional floor pulled out from under him. Detesting himself for his own insecurity, he realizes that his desires for Dickie's body and money are actually desires to *be* Dickie.

In tackling the elusive issues of identity, Highsmith discovered her own allusive style. As Tom moves from emotional turmoil to matter-of-fact criminality, he engages in a bewildering exchange of passports, traveling around Italy as Dickie after he has dispatched his erstwhile friend to the bottom of a lake. But as Tom withdraws from his old, unwanted identity to that of a more confident, sophisticated expatriate, so Highsmith withdraws from her precise descriptions of Tom's emotional states. More and more she simply describes the explanations that Tom provides for himself. As the chances for detection increase, so does Tom's recklessness. But each success breeds confidence, and with his new confidence he shucks his guilt, replacing it with a well-considered wariness. *The Talented Mr. Ripley* ends with Tom disembarking from a ferry to Greece, wondering almost idly whether he will always be afraid that a stranger is a policeman.

Highsmith put aside Ripley — though not writing — for 15 years, picking him up again with *Ripley Under Ground* (1970), which finds Tom in his early 30s and no longer much worried about strangers. Time has been good to him, at last imparting his long-sought sophistication. It has also apparently eliminated his interest in men; at least, he's now married to the daughter of a French pharmaceutical manufacturer, a Gaullist bore whom Tom assiduously avoids but who has provided a small estate 50 miles from Paris. Tom supplements his income with, among other things, a 10 percent cut of an ongoing English art fraud. When the scam is threatened by exposure, Tom is called on to save it, using his ability to shift identity. Thanks to Highsmith's now almost completely inferential style and macabre humor, *Ripley Under Ground* at first reading appears to be a conventional detective story, albeit one told sympathetically from the point of view of the crooks. But Tom's murderous

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Ripley

Continued from page 5

habits are continuing, in ever more creative ways (he forces a suicide here) and for ever more confusing reasons. Apparently impulsive and un-thought-out, Tom's homicides are always marked by getaway arrangements that are cool and meticulous (and, amusingly, always seem to involve a bus ride away from the scene of the crime, as in *Strangers on a Train*; this coincidence of the melodramatic and the mundane is at the core of Highsmith's sensibility). They invariably pay off in Tom's continued material comfort, but each one has its immediate cause in an affront to Tom's sense of etiquette, some imagined insult or a resentment carried on too long. And although the art scam — the sale of forged paintings, ostensibly by an artist who in fact has died — is no doubt profitable, Tom sincerely prefers the bogus new works to the real things. Even the profit is worth only what it can buy: gifts for Héloise, the time to study German so he can read Goethe. When Tom is getting ready to pull off one of his felonies, he frequently revs up by listening to Mendelssohn's Overture to *A Midsummer's Night Dream*. This is the aestheticization of crime.

Highsmith, whose humor had been flourishing in her other thrillers between Ripley's escapades, also began, with *Ripley Under Ground*, to make that a feature of the Ripley stories. In fact, the title refers to an episode in which Ripley deals with a particularly down-in-the-mouth houseguest who, before he commits suicide, wants to kill Tom. Ripley keeps fending off the attempts good-naturedly (because he thinks the perpetrator, a forger, is a man of genius), to the point of waiting while the would-be killer throws dirt on what he thinks is Ripley's corpse.

Things continue apace in *Ripley's Game* (1974), in which Highsmith's humor reaches new heights of sardonicism. The game in question is Ripley's attempt to manipulate a poor soul with a terminal disease into committing one or two murders at the behest of a German gambling ring. Again, although the action will enrich Ripley, his motivation is a perceived insult at the hands of his victim; the gamblers and the mafiosi they are squabbling with are completely odious to Ripley, squalidly lower class.

The dark turns apparent in Ripley's game become almost elegiac in *The Boy Who Followed Ripley* (1980), Highsmith's last (so far) Ripley tale. Although Highsmith's humor is now an inescapable component of the series (Ripley performs one impressive bit of derring-do in high drag), this latest story has the air of a farewell. It's payback time for Ripley: all his criminal activity has given him a slight but definite reputation available to anyone who wants to comb newspaper files, and now he's sought out by the 16-year-old son of a deceased supermarket magnate. The old man died falling off a cliff in his wheelchair (suicide? accident?); now the boy, Frank Pierson, is consumed by guilt and wants Ripley to tell him how to live with it. For all the adventures of the book, it is preoccupied with this single encounter, as Tom, now sliding into middle age, attempts to pass on his accumulated knowledge to a boy who desperately needs it. Highsmith keeps her prose as spare as usual, sticking to descriptions of emotional states and actions and to dialogue, letting the missed connections and unspoken desires emerge in a kind of quiet overtone.

Of course Ripley is a monster. He's a charming one, though, an amoralist who might have been wittily devastating in a Victorian drawing room, and now fits comfortably into the sunny surface of life on the international fringe. But amorality isn't an heirloom, according to Highsmith, it's a defect; and Ripley's increasingly frenzied efforts to bequeath it to Frank introduce a poignant note that has been missing in the series since the early chapters of *The Talented Mr. Ripley*. In *The Boy Who Followed Ripley* Highsmith resorts noticeably to metaphor, as she has only rarely in the past: carpenter ants are slowly buzzing away in Ripley's bathroom, burrowing from within. Highsmith has brought her antihero back to where he started: the verge of empty-handedness, where he confronts the ephemerality of his pleasures and the anxiety of his loneliness. □

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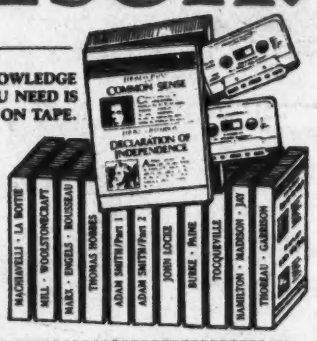

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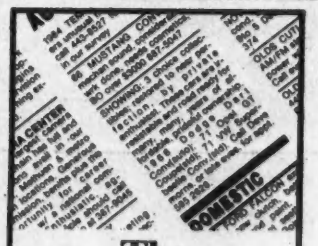

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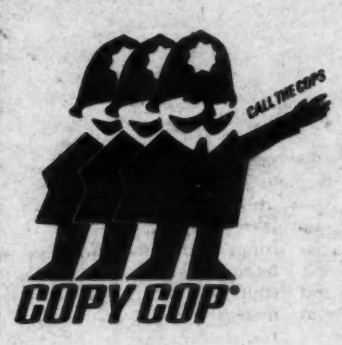

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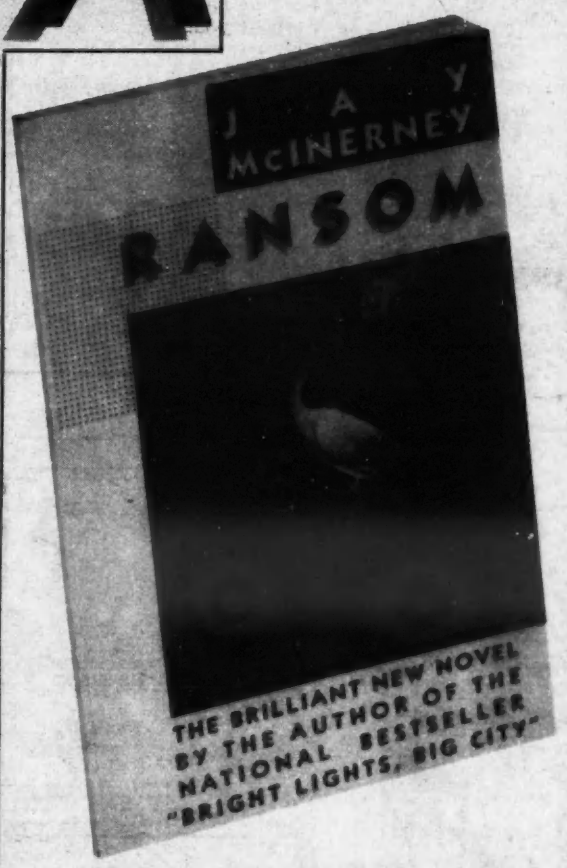

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